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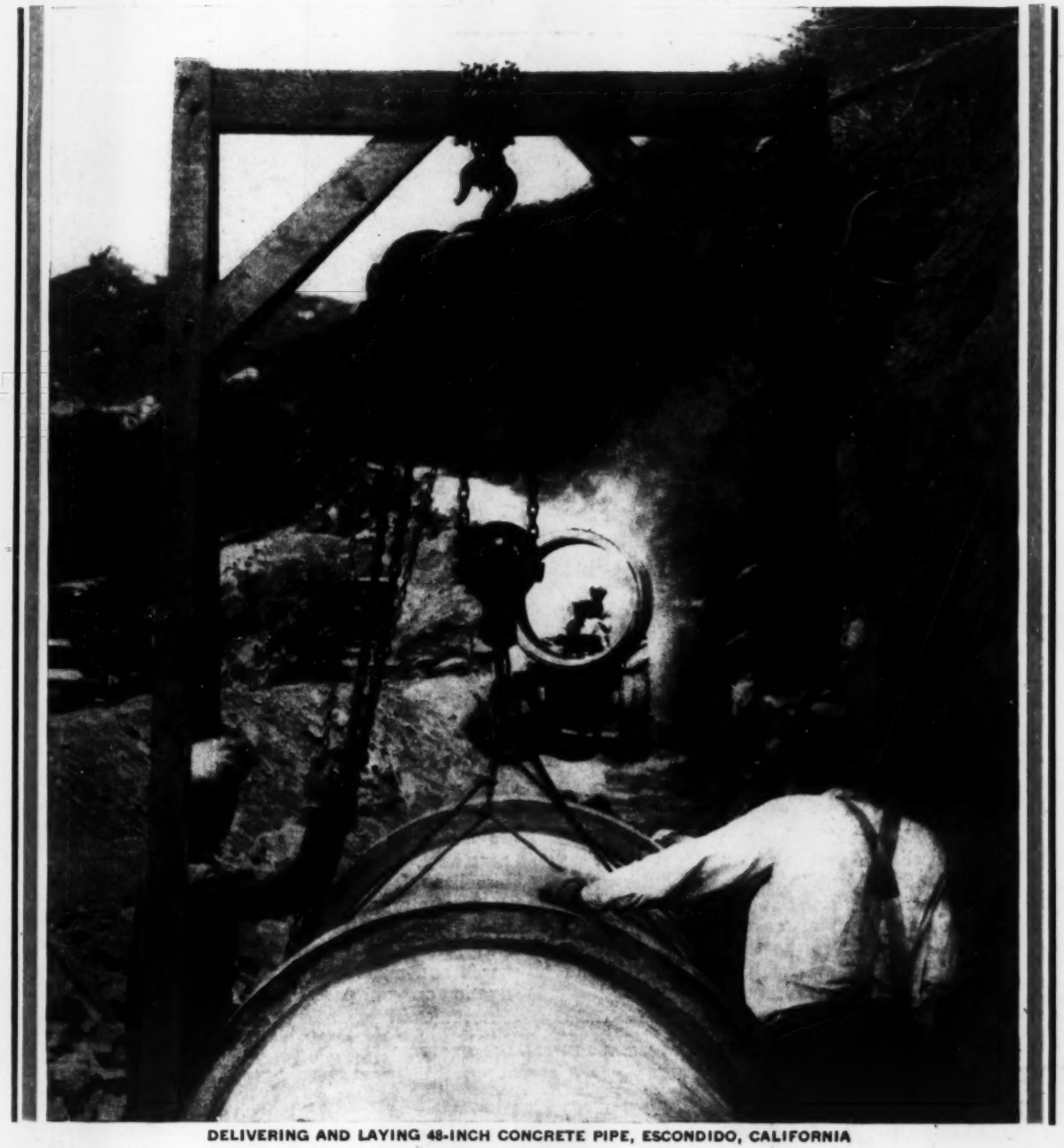

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Spun Concrete Pipe Conveys Water Supply Under a 145-ft. Head

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Contents

Volume 102, Number 26, June 27, 1929

Supporting Foundations Exposed During Nassau St. Subway Construction.....1018
HALF A MILE of underpinning required to carry buildings virtually undermined by deep cut in narrow street. By Lazarus White

Spun Concrete Pipe Conveys Water Supply Under 145-Ft. Head.....1023
THREE-TON, 8-ft. sections trucked 115 miles and the joints successfully dry calked with cement. By H. Hawgood

Motor Truck for House-Connection Gangs, Richmond, Va......1025
PUSH CART displaced by tool box on Ford truck, then by improved truck for tools, pipe and gangs of men. By G. W. James, Jr.

Extensive Land Drainage Work in Arkansas.....1026
TWO DISTRICTS rehabilitated as one project of 340 square miles and capacity provided to carry off intense rainfall. By H. W. English and Albert S. Fry

Construction Camp and Program for San Gabriel Dam.....1030
CAMP for 1,500 men started with 500-man unit. A feature is a separate contract for commissary and camp operation. By E. C. Eaton

What Do You Pay For When You Buy a Load of Sand?.....1032
THIS ARTICLE outlines one of the most common, yet widely disregarded, problems of construction. By E. R. Dawley

Enlarged Freight Yard and Engine Terminal for N. & W. Railway.....1033
SIZE AND CAPACITY doubled at Portsmouth, Ohio, while yard business is carried on without interruption.

Neglect of Precautions Caused Cleveland Clinic Disaster.....1037
MANY VIOLATIONS of Fire Underwriters' regulations cited in reports made by investigators.

Editorial.....1015

From Job and Office.....1039

Letters to the Editor.....1043

News of the Week.....1045

Construction Equipment and Materials.....1051

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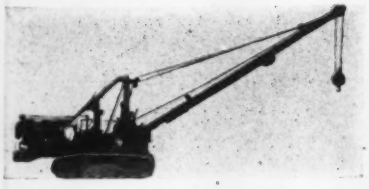

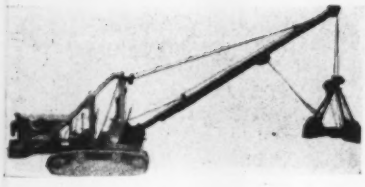

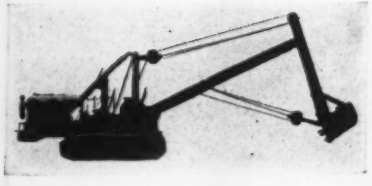

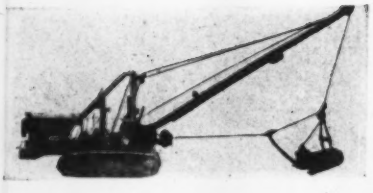

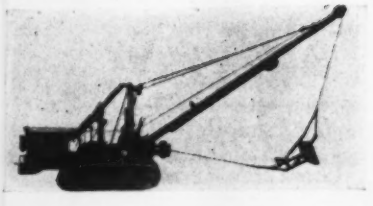

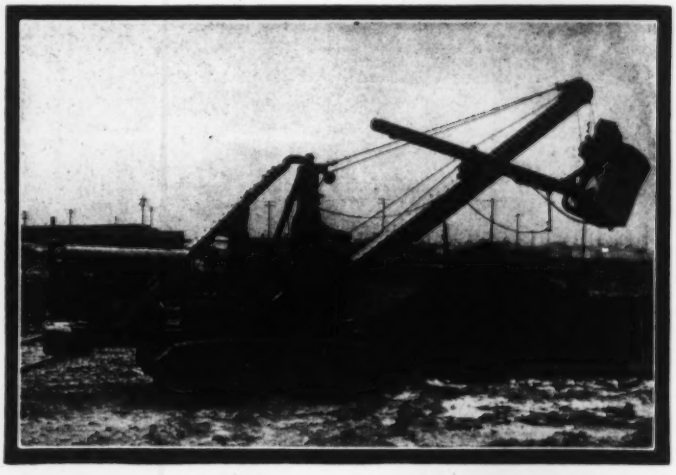

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Science and Fifty Years

TWO semi-centennials are being celebrated this year: the birth of the electric railway, and the commercial perfection of Edison's incandescent lamp. Together, the developments are the root of the prodigious growth of electric power production and utilization that makes the current century what it is. The dynamo-electric machine had been created at an earlier day, it is true, and the motor was also known, but without the creation of the lamp and the railway to utilize electric power the art would hardly have attained more than a fraction of its progress. Yet invention was not the only thing, and perhaps not the primary thing, responsible for the meteoric rapidity of electrical growth, for the art of practical electricity far more than any other rests on science. A small number of physical observations and laws deduced from them laid a foundation from which the great structure of the art could develop by mathematical processes almost in its entirety—supplemented by ingenuity and invention to develop the myriad items of practice necessary to make the art useful. There is no more inspiring example of the power of science in the practical service of man.

Runoff From Dry Areas

INTERPRETATION of rainfall and runoff records requires that the nature of the soil and vegetation on the watershed be taken into account. In regions of high precipitation the ground always is more or less moist, undergrowth remains green the year round and the capacity of the surface soil for absorbing moisture has a relatively low variation. In arid or semi-arid areas, on the other hand, there may be very wide variations in absorptive capacity of the surface soils. Where vegetation is sparse or entirely absent, winds have direct access to the soil and may parch it to extreme dryness. Under these conditions and with only light precipitation, the soil may absorb a considerable percentage of the rainfall so that a very low runoff coefficient may be found to apply more or less uniformly to the moderate storms. However, once in a while there is heavy precipitation on an arid watershed, the soil becomes saturated, and an abnormal runoff coefficient results. At such times a given amount of precipitation on the barren watershed will give an abnormally high runoff. This danger of extreme floods in arid regions is confirmed by surface markings. In such territory the rate of runoff is always rather uncertain and at best the records are less dependable than runoff records in humid regions. For these reasons the design of structures that have to do with runoff from arid areas calls for a materially wider margin of safety than would be necessary elsewhere.

Gas Welding Looks Up

MORE than ordinary significance attaches to the Union Carbide research building under construction at Niagara Falls, N. Y. It is the first gas-welded building of any appreciable size yet attempted, and according to announcement is the original unit of a series of other structures to be designed and erected with the aid of the oxyacetylene process. Such activity is encouraging indeed. Nearly three years ago a series of load tests on gas-welded roof trusses showed results comparing favorably with riveted and with arc-welded trusses. Since then the gas-welding art has made little progress in structural applications, while arc welding continued to go forward and found use in even larger structures. It is therefore encouraging to see a revival in the gas-welding process, and a step which carries it from the light construction of the former test trusses to the heavy work necessary in a 20-ton crane runway. The art of structural welding will benefit immeasurably by having gas and arc processes develop side by side. Both claim a place in structural work, and if their comparative advantages are controversial they will become clear with continued practice. Gas welding is less rapidly done than arc welding, but this may be in fact an advantage if too rapid deposition of the weld metal is conducive to poor workmanship. In the case of joints to carry impact loads, a somewhat greater ductility is claimed for the gas weld, though this argument is by no means conceded by the advocates of arc welding. With gas welding again in active development the structural engineer will soon be in better position to weigh the various available methods of steel fabrication on the basis of fundamentals.

No Precautions

NO SAFETY precautions worthy of the name were taken in the film storage of the Cleveland Clinic, it now appears from the facts developed by the investigations that are reported in brief extract elsewhere in this issue. The storage room, full of inflammable and explosive material, had a hot steam pipe running through it, and electric lamps hanging from flexible cords in such a way that they might readily be in contact with films; the fire door which was intended to isolate the room in emergency was a delusion, for it would not close when the emergency came; and the apparent isolation of the room actually was quite the opposite, for a pipe tunnel connected it with the various parts of the hospital by means of flues. Finally, the entire storage vault was merely an improvisation, since it was a room destined for other purposes and merely taken over for the storage. It is very clear that safety did not exist at any time since the film-storage room was first put into use. What was said in these columns some weeks ago as to the need of maintaining safety, true though it may be, proves to have less direct application to this case than the primary teaching that important hazards must be combated by thoroughly designed and thoroughly executed safety construction. Failure to provide such construction must be laid on the shoulders of the responsible executive head of an institution, not upon the chance agency that may, at some unfortunate time, bring about the fatal combination of circumstances. At Cleveland, for example, the steam-

fitter whose act led directly to the fire can hardly be charged with having known the hazards of the room in which he was working. The blame inevitably goes higher up, a truth which is well worth the thoughtful attention of executives and managers everywhere.

Obstinacy Wins but Loses

VIRTUAL dismissal of about three hundred assistant engineers, transitmen and draftsmen by the Board of Transportation of New York City last week came as the climax of a controversy in which obstinacy supplanted reason in the dealings between employer and employee. In the public service above all, such a condition implies unwise management. Responsibility rests primarily upon Commissioner Delaney, head of the board, because through his unreasonable attitude toward the men a matter which should have been handled by sensible negotiation was allowed to become the subject of threatened strikes and of mass demonstrations in public places. Technically he was under no obligation to grant the increased wage asked for, but as he was spending the city's money and as the city's chief administrative body had approved the rates and put them into effect in city departments it should have been obvious to him that ultimately they would have to be effective on the subway work. Appreciation of that fact might well have led him to meet the men half way. On the other hand no little responsibility rests upon the men for having antagonized the commissioner and city officials by adopting outworn labor-union tactics. The wage increase which was the cause of the controversy was won by negotiations with the city officials—acrimonious at times, it is true, but man-to-man dealings nevertheless. The lesson learned in that undertaking should not have been so lightly cast aside. The men lose, and the city loses through reduced efficiency.

Roadside Beautification

EVIDENCE is accumulating in many ways that roadside attractiveness is gaining favor as a public roads policy. By formal action a year ago Congress recognized roadside beautification as a proper use for federal-aid money. Nine state highway departments are now carrying on landscaping work with maintenance money or special funds. The departments of all states are exercising their power to keep highway rights-of-way neat by eradicating advertising signs. Nearly every highway official performs work directed toward keeping the roadsides attractive, if it amounts only to mowing weeds. The work should go on; at the same time its proper place in road development should be understood clearly.

Beautification has its legitimate place when considered as one item of complete roadside service. Edward N. Hines emphasized its importance in admirable manner in *Engineering News-Record*, Jan. 3, 1929, p. 32. As he outlined the field, full service includes camps, comfort stations, certified drinking water, signs and signals, and all things needed either for conveniencing and pleasuring travel or for safeguarding traffic. Even in pure landscaping there should always be the practical purposes of keeping clear sight-lines and providing wind and snow breaks. Landscaping a highway is much more than garden making, and roadside improvement goes much beyond landscaping.

There is some danger that highway beautifiers may forget this broad truth unless the practical roadbuilder keeps a sane regard for traffic service prominently before him. The highway beyond all other things is a practical tool of transportation, but attractiveness is an essential contribution to its efficiency. Good appearance is a business asset. If the public highways were each an independent transportation line competing for business for hire, there would be greater attempts than are now made to attract travel by clean and sightly roadsides.

In summary, beautification is one of many roadside services being demanded by modern highway travel. It is contributory rather than primary; as is the case with all other roadside services, it is supplementary to roadway service. If these facts are held in mind, landscaping may well go as far as sane taste and available funds can take it.

Toll-Bridge Developments

PASSAGE of a toll-bridge authority law in California is significant evidence of the trend of current sentiment. It strongly reinforces the indications given by the passage of the Alabama bridge corporation act recently, in showing that a weighty current of opinion has set against private exploitation of toll bridges. Moreover, although only two or three states have reached a stage of actual legislation unfriendly to the private toll bridge, the sentiment is well known to be widespread, and legislation in other states is not at all unlikely.

A very short space of years has seen this sentiment grow from almost nothing to formidable proportions. It originated, at least in part, out of the belief that the owners of toll bridges were capitalizing not merely their own enterprise but also the public investment in the tributary road system. It was nurtured by resentment aroused by occasional incidents in which public officials acted as though they desired to see private toll bridges built instead of free bridges. It received further impetus from the energetic activity of bridge promoters and bond sellers to obtain franchises for private toll bridges, in some cases patently for purposes of sale, in others for the purpose of floating large bond issues which could be shaved very profitably and still leave the speculative possibilities of dividends in possession of the promoting and selling groups. Such financial procedures, which in years gone by might have passed unnoticed, are more transparent today, now that the public vision has been sharpened by many a costly piece of stock-market and financial education.

It need not be wondered that hostile sentiment thrived under such circumstances, for the public is impatient of improper exploitation. But such impatience does not imply a desire to deny invested capital its proper earnings, or to refuse to reimburse development cost and enterprise. There is sufficiently extensive knowledge of financial and economic matters spread among the people to give them a fair understanding of the fact that any development has necessary initial costs, and of the truth that capital investment must be paid for at interest rates proportional to risk. Accordingly, public resentment is not directed against private toll-bridge investment, but rather against such investment when combined with the element of improper speculation and exploitation of public necessities.

As has been said on several occasions, in these columns and elsewhere, private toll-bridge enterprise has the merit that a project is not likely to be built where the traffic will not support it, while a public project may be the response to local or political pressure and may prove incapable of paying its way on reasonable tolls.

This fact and the freer money market of private enterprise, which is not hedged around by narrow restrictions and long delays as are public undertakings, form two of the reasons which have made private development logical and useful. But such advantages will receive recognition only so long as the costs laid upon the public are not usurious.

Such costs include initial development cost, interest or other fixed charges, a dividend in repayment of risk and enterprise, and finally amortization. Few toll-bridge promoters, however, have limited themselves to such returns. Very commonly the financing requires the user not only to retire the entire construction cost in the shape of bond repayments but also to pay for the bridge a second time through promotion stock which retains the ownership of the structure after its bonded cost has already been amortized. Such financing methods, reminiscent of early railroad promotion practices, were bound to arouse the opposition of the road users. They have done so with unexpected rapidity.

Revenue financing by public authorities has in the meantime proved its soundness and convenience in many examples, and recognition of its value is becoming general. Used prudently, it is an expedient of great potentiality. Its application to the construction of major bridges may therefore be expected to progress.

Private enterprise nevertheless retains a large and proper field. It can hold this field in large measure if it will base its financial plans and procedures on the necessity of competing fairly and favorably with public enterprise. It has not done so in the past, and there is yet no evidence that bridge promoters and bond houses are prepared to adapt themselves to the requirement. Unless they do, however, private toll-bridge enterprise is sure to see a sharp shrinkage.

Census Changes

EVERYONE who uses census statistics is likely to be inconvenienced, if not distressed, by the variations from census to census that make the figures not readily comparable. These come through omissions, changes in classification and in date. Much of this is unavoidable if changing conditions are to be met and pace is to be kept with progress. The bill for the Fifteenth Decennial Census of the United States, as signed by President Hoover June 18, changes the date of enumeration for the third time in succession.

Compared with eight successive previous counts, each as of the same month and day, and each after a lapse of ten years, the 1910 census covered a "decennium" of 9 years 10½ months, and the 1920 census a period of 9 years 8½ months; but the 1930 census "decennium" will be extended to 10¼ years. From 1790 to 1820 the census was taken as of the first Monday in August, making the census of 1830 about two months short of the full decennium of each of the first four enumerations. For most statistical purposes that time shortage can be ignored. But the two short "decenniums" just passed and the overlong one to come, each differing from the other and from the full ten-year periods from 1830 to 1900, entail much computation for strictly comparative purposes. To assume that they are within the range of variation due to inaccuracies would only add to the confusion, since the time variations might only increase the results of assumed inaccuracies.

There is no certainty that the month and day of the sixteenth and later enumerations will not see further changes, for as between the two branches of Congress the only agreement as to the date of the next census was that a change from Jan. 1 was desirable. The House, in which the census bill originated, set back the date to May 1. The Senate advanced it to Nov. 30, 1929. The joint conference first restored the May 1 date and then made a shift to April 1.

While there can be no certainty of a permanent date for the census, and thus a real decennium between enumerations, yet with the improvements that have already come from a permanent Census Bureau there is some reason to hope that after a decade or two more the month and day of enumeration will be made constant. Neither August nor June is likely to enter into the picture again, since August would be the worst possible date for the census on account of its general adoption as a vacation month, and June is only some degree better for a considerable part of the population of cities. Jan. 1, the date used for the 1920 census, seems to have little claim except that it corresponds with the calendar year. Throughout a large and populous part of the country January weather is not conducive to the comfort and convenience of the enumerators; and while a few decades ago farmers might have been found at home in largest numbers then, many of them now are in Florida or California or on visits to some city during the winter months. May 1, substituted by the Senate for the House bill date of Nov. 1, is only a month earlier than the long-used June 1 date. April 1 is but two months earlier, but will find as many farmers and more city residents at home than June. It is also far from the close of the harvest year and as objectionable as to recent changes in farm tenancy and ownership, two objections raised by the agricultural interests, as is June 1.

The contention of the House for Nov. 30 and of the Senate for May 1 (finally compromised to April 1) combined with increasing population and industry and the growing need for specialization on the part of the enumerators, suggest that the population and farm enumerations be taken separately, at the date best suited to each, and as often as warranted, thus ending the see-saw for a late-in-the-year date for land products and a date well on in the year for the population statistics. Already the census of manufactures is taken by itself, every second odd year, by special agents. Already there is a census of agriculture half way between the decennial periods. Already statistics of states and statistics of the cities over 30,000 are gathered annually. Segregation must be extended. If done, more specialist enumerators can be employed, as is much needed, and the period of the year best suited to each class of statistics can be used.

It should be remembered that the population count was the original and for decades the main object of the census of the United States. With one subject after another added, the census became overloaded and broke down, necessitating the segregation that has already gone so far. The pressure to overload the decennial census still continues. It must be resisted.

The population count must be restored to its original first place in the census. Moreover, with a country as large and growing as rapidly as the United States, particularly in urban districts, a population count at ten-year intervals is inadequate. Once in five years is none too frequent. It will become more feasible as the other fields of enumeration are segregated and specialized. A fixed date and an unvarying interval between each census should be maintained. Let there be no more decenniums of varying length.

Supporting Foundations Exposed During Nassau St. Subway Construction

Over Half a Mile of Underpinning Required on New York Subway to Carry Buildings and Other Structures Virtually Undermined by Adjacent Deep Cut for Subway in Narrow Street

By Lazarus White

President, Spencer, White & Prentis, Inc., New York, N. Y.

THE Nassau St. subway in down-town New York has presented unusual difficulties in location, design of structure and construction. Starting under the approach to Brooklyn Bridge, skirting heavy buildings, passing close alongside and over existing subways, and occupying almost the full width of an exceedingly narrow, much-congested street, the engineering planning had to be special in almost every general feature of structure. Construction likewise was complicated by depth and the necessity of maintaining an almost continuous succession of heavy and old structures besides the usual care of street surface, gas and water mains, electric conduits and other underground services. This article covers that portion of the work between Chambers St. and Liberty St., which is shown by Fig. 1.

General Engineering Conditions

Briefly the Nassau St. subway, which is being built in two sections, is the final link of the Dual Subway system started in 1911 and put in operation in 1916. It together with the extension into Broad St. will connect the Chambers St. station under the Municipal Building in Manhattan with the tunnels of the Brooklyn-Manhattan Transit system to Brooklyn.

After many years of delay, largely because of fear of the cost and difficulties, the contracts for this and the adjoining section were let by the Board of Transportation late in 1927. Even after the contracts had been awarded there was delay. Strong opposition to their confirmation by the Board of Estimate and Apportionment was shown by a property owners' association, which proposed a tunnel instead of the cut-and-cover subway called for in the contract. After examination of this alternative plan by the engineers of the Board of Transportation and after extended hearings, the original plans were confirmed and the contracts delivered in February, 1928. The contract price of the two sections was about $10,000,000 for about 6,000 ft. of double-track subway, including two stations.

Location Difficulties—The location of the section shown by Fig. 1 was difficult. In Park Row there were various structures lying crosswise of the proposed structure, while farther south only a narrow space was available between the World and Tribune buildings and the adjacent structure of the original subway on Park Row. The new subway also had to pass over an existing subway at Beekman St. and the location of a future subway at Fulton St.

In Park Row a large portion of the disused "bridge loop"—an underground two-track subway—occupied the space necessary for the new structure, as did portions of a mezzanine approach to the Brooklyn Bridge and numerous foundations for elevated-railroad and bridge-approach columns. The final plans provided for cutting away large portions of these structures and underpinning them so as to allow the construction of the new subway, which will finally serve as their support. Between the World Building and the old subway, a distance of only 30 ft., three tracks had to be located. This necessitated a deep track alongside the old subway and the under-

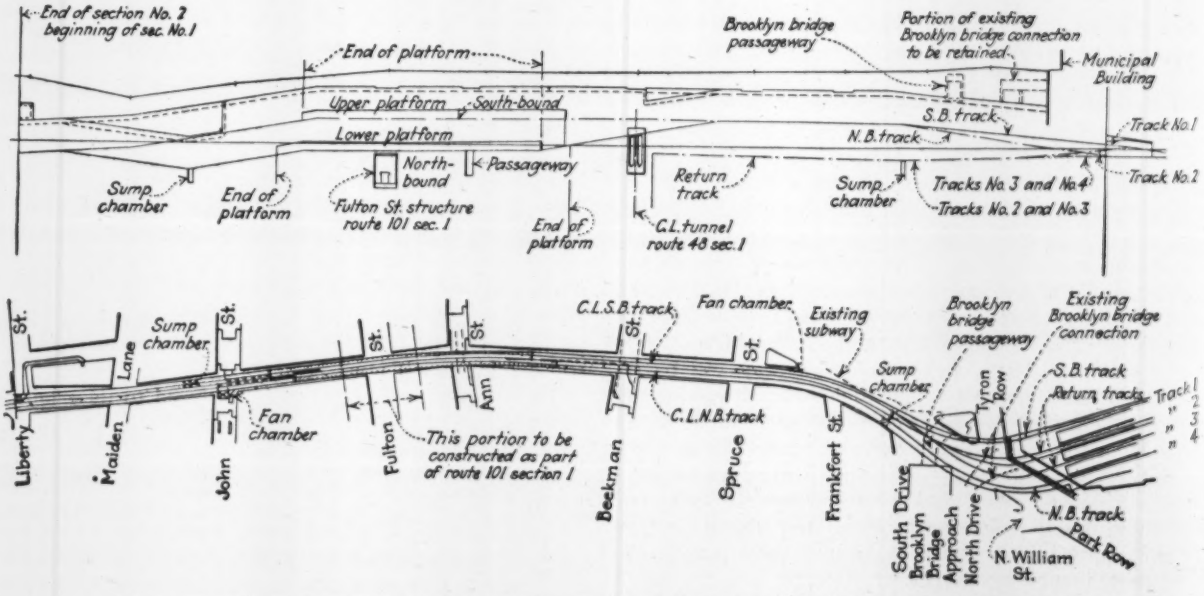


FIG. 1—PLAN AND PROFILE OF NASSAU ST. SUBWAY FRO M BROOKLYN BRIDGE TO LIBERTY ST.

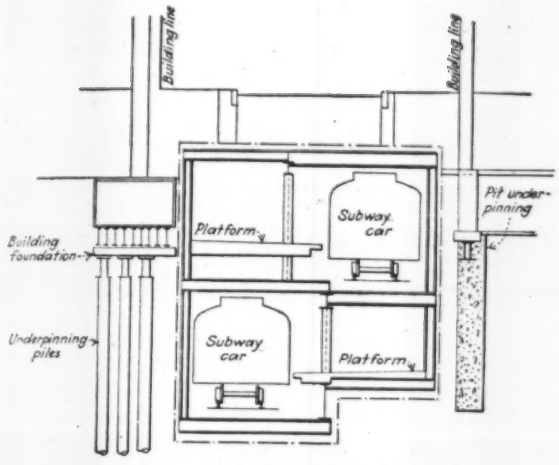


FIG. 2—CROSS-SECTION THROUGH STATION AT FULTON ST.

pinning of several hundred feet of its side wall. In places Nassau St. is only 34 ft. wide, and it was necessary to have an important station at Fulton St. This was accomplished by designing a new type of station—one with each track and platform at a different level, as shown by Fig. 2.

Construction Difficulties—With the problems of location and design there were numerous underpinning problems. The depth of subway necessitated excavating below the levels of the foundations of all but two of the buildings, in material varying from coarse to very fine sand. This very fine sand with clay in alternating layers —typical Manhattan quicksand—extends from Fulton St. to lower Broad St. The maximum distance of subgrade of the subway excavation below water level is about 20 ft. in the vicinity of Maiden Lane.

The contractor was required to safeguard all the buildings and structures along the route and to prepare underpinning plans to be submitted to the engineers of the Board of Transportation for their approval. This was a work of great magnitude, involving the underpinning of the bridge loop, the mezzanine passageway of the bridge station, 26 elevated and bridge columns and 250 ft. of subway wall and many buildings. The number of buildings involved was 52, and the column loads to be directly underpinned were as great as 1,200 tons. The length of building to be safeguarded was 2,423 ft. Underpinning was the more difficult because rock or hardpan was in no case within striking distance. At the World Building borings showed rock to be over 160 ft. below street level.

An interesting obstacle discovered under Park Row was the remains of masonry structures dating back to early New York times. An old retaining wall about 20 ft. high had been built north of the World Building and facing the East River, then various old warehouses to the eastward—these buildings having massive barrel vaults abutting on the retaining wall. These vaults were formerly used as wine cellars and later for paper storage until the buildings were torn down for the Brooklyn Bridge approach; the old vaults were used to support the sidewalks and other structures of the bridge. There were also found remains of old building foundations and vaults, including one supposed to have been used as a British prison in Revolutionary days. Some of the old vaults were laid up in bricks probably imported from Holland. All this old masonry was of excellent quality. Also it is interesting to note that all the masonry of the Brooklyn Bridge which had to be cut out was of uniformly good quality.

General Construction Methods

The Board of Transportation provided the contractor with suitable yard space within a third of a mile of the work. This central yard was equipped with a machine shop and central concrete mixing plant, and provided for bulk storage.

As the only place in this congested section where trucks could be operated into the subway excavation was near the Brooklyn Bridge, a ramp or incline was built beneath one driveway of the bridge from a side street. By utilizing space beneath the bridge approach near Park Row for installing a central compressor plant, store room, men's locker rooms, field emergency hospital and accessory buildings, the contractor was able to operate with no disadvantage due to traffic.

Three other operating points were located at Spruce St., Ann St. and Maiden Lane. The Spruce St. shaft, 40 ft. deep to subgrade, forms part of the permanent ventilating equipment of the subway, located off-line between Nassau St. and Park Row. An overhead deck spanning Nassau St. allowed the use of a derrick and bin during excavation without hindering the dense street traffic. At Ann St., a working shaft was put down off-line on property furnished by the city. The Maiden Lane shaft was located in the wide sidewalk adjoining the Federal Reserve bank, while the hoist and bin were put on an overhead deck spanning four corners of the intersecting streets.

Timbering and Excavation—Owing to the traffic and business conditions on Nassau St. the contract provided that no replacing of street surface by temporary decking should be done during ordinary business hours—8 a. m. to 7 p. m.—nor was any storage of material along Nas-

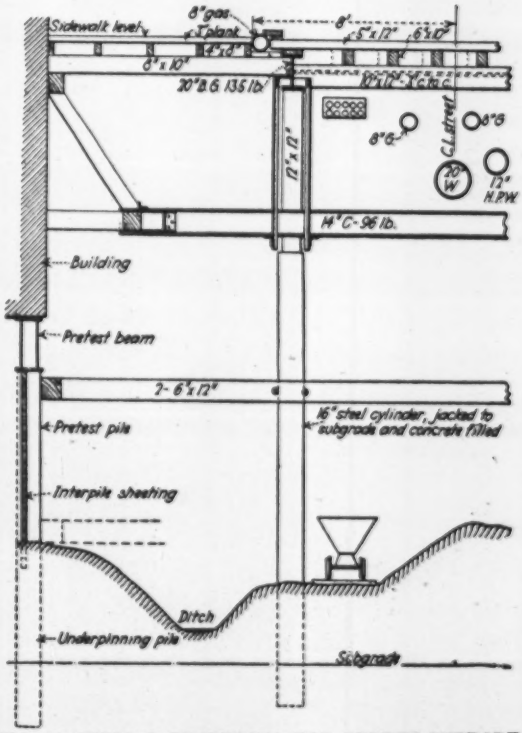


FIG. 3—TYPICAL TIMBERING FOR STREET SUPPORT

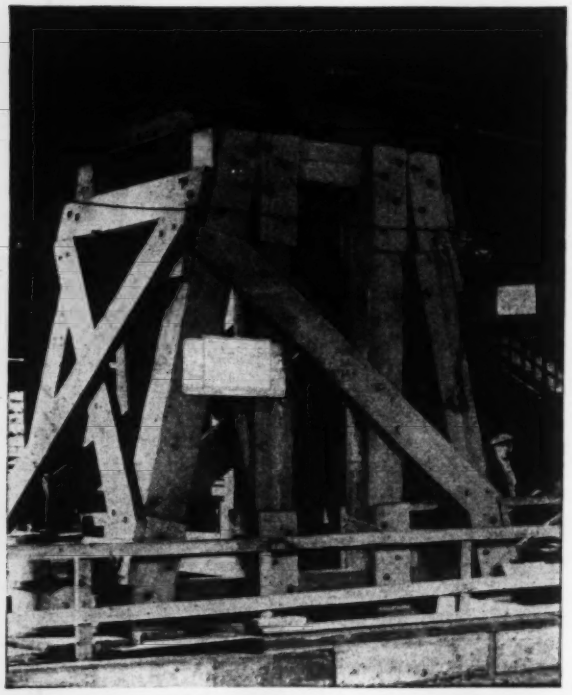


FIG. 4—ABOVE-STREET TIMBER TOWER CARRYING ELEVATED RAILWAY COLUMN

sau St. permitted. This work was done at night and on Sundays and holidays. The street surface was usually dug up in stretches of about 50 ft. at night and immediately decked with steel and timber; in no case was there a failure to open up the street to traffic by 8 a. m. of a business day, despite many rainy nights.

The system of timbering and decking is shown by Fig. 3. Its essential features are two longitudinal beams laid close to the street surface and the cross or hanging beams (the main braces) at 10 to 20 ft. intervals. By a liberal use of steel large spans can be used, in this case up to 45 ft., allowing for freedom of posting and facility for building the subway structure and renewing timber and bracing as necessity required in later operations.

All excavation was by hand-loading side dump cars, either direct or by means of portable belt conveyors. Locomotives operating on a 24-in. track were either storage-battery or gasoline, capable of operating up a 5 per cent grade. Hand loading was found advisable, although the timber system contemplated the use of power shovels; the volume of vault walls in the narrow excavation and the amount of hand labor necessary to clear away material to do the required timbering and in caring for the many underground structures precluded the economic use of the power shovel, and under these conditions the cost of the actual handling of the material into cars is small as compared with the other necessary work.

Geology of Region Revealed

The excavation provided an interesting revelation of the geology of lower Manhattan Island. At City Hall there is a sand hill composed of rather coarse sand interbedded with thin gravel layers, stratified irregularly and dipping as sharply as 45 deg. The coarse materials extend to about mean sea level, below which the sand is much finer and contains clay layers. At Ann St. the materials change abruptly to fine sand layers evidently deposited under water as outwash from the sand hills to the north. The materials reach the maximum fineness at Maiden Lane, where there is a deep depression. Here there are deposits of very fine material (Manhat-

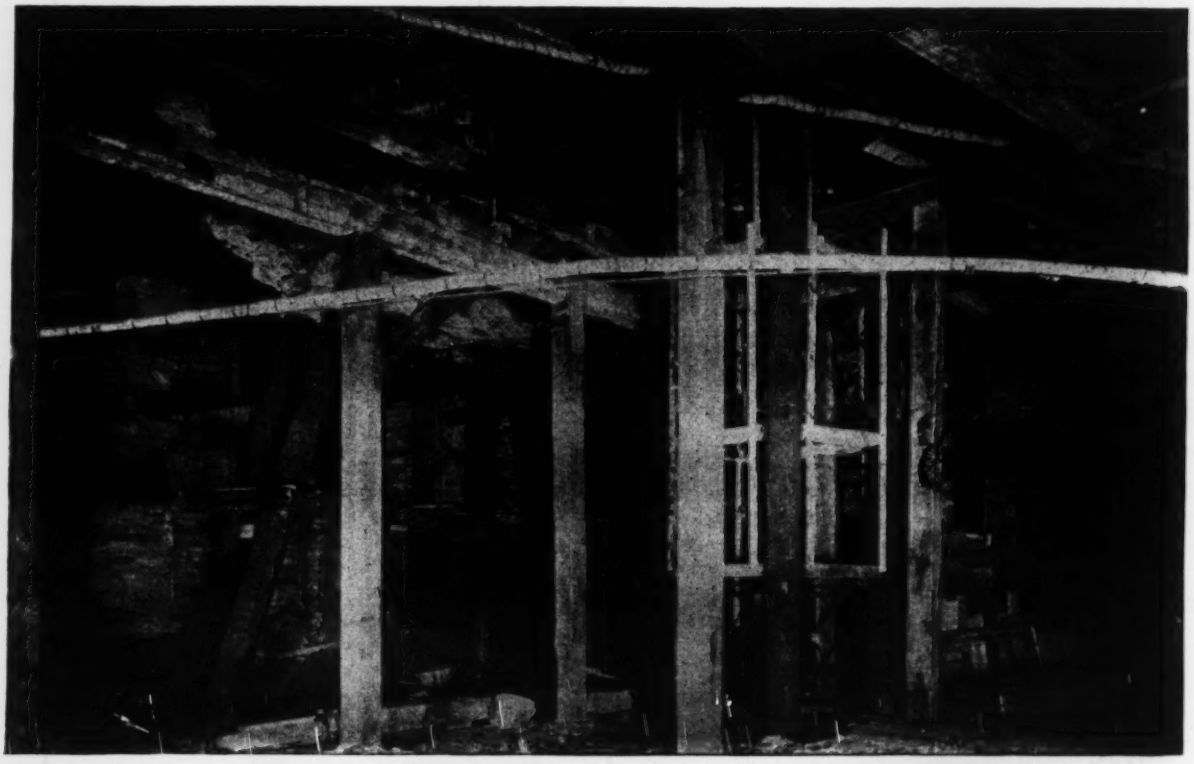


FIG. 5—UNDER-STREET STEEL CYLINDERS CARRYING TOWER SHOWN BY FIG. 4

tan quicksand) and some rather thick clay layers. The rock and hardpan come up rapidly toward Wall St., where the rock is only about 60 ft. below the street surface. In this district the rock is usually overlain by hardpan, glacial drift or boulder till, from a few feet to 20 ft. thick. This hardpan usually provides an excellent foundation and has great bearing value.

Handling Underground Water

Drainage Methods—The sand conditions affected in varying degrees the methods of drainage. Well points connected to a centrifugal pump were used where coarse sand was to be drained, as at Brooklyn Bridge. In the central and northerly parts gravel-screened sumps drained by centrifugal pumps were used in quite fine materials. At Maiden Lane neither screened sumps nor well points would have been effective. Here the water level had to be lowered over 20 ft. in the finest materials.

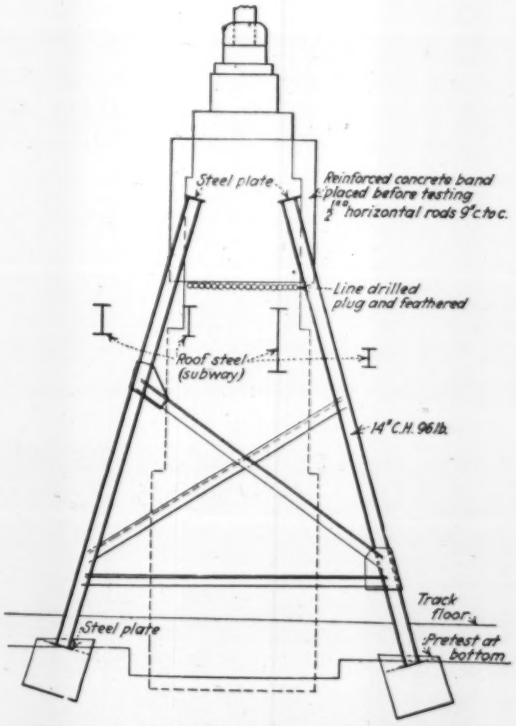


FIG. 6—BATTER POST UNDERPINNING FOR ELEVATED RAILWAY COLUMN

It was accomplished by means of ditches, leading the water back to sumps at low points. The central wide ditches with very flat side slopes (Fig. 3) allowed about 2½ ft. of ground to drain at a time, leaving dry berms on each side. After a little draining the materials which while wet would run on a very flat slope—about 1 to 10—would stand vertically and exhibit the properties of a weak solid. The solidifying of the berms on each side after drainage was a very valuable feature, as it permitted placing horizontal sheeting back of the first row of underpinning piles.

By using individual track and hand mucking, layer after layer was peeled off until subgrade was reached. The men seldom were required to dig wet materials, as by proper placing of the ditches a dry berm 2 to 3 ft. high was maintained. By this method the ground was always solid and boiling was avoided. If excavation was forced into the material with undue speed boiling might cause loss of ground back of the sheeting and under adjacent buildings.

The problems of underpinning were so numerous that only a few examples can be given. A typical elevated-railway column support is shown in Fig. 4, where a

FIG. 7—VIEW SOUTH ON NASSAU ST. SHOWING TYPES OF UNDERPINNING

wood tower set on parallel steel beams was built around an elevated column and wedged tight under the railroad structure above. From beneath the supporting beams of the tower below the street surface, four steel cylinders in about 5-ft. sections were jacked downward through the sand for about 40 ft., to a point below subgrade. Alternately with jacking downward, the sand was taken out from the inside to a point about 1 ft. above the bottom edge. On reaching subgrade, concrete was placed inside the shells, and the four piles as a group were "pretested" against the under side of the tower support until the full load on the column was taken off the column base. As excavation below the street surface for the subway cut increased in depth, the four cylinders were braced and tied together as a single supporting unit. (Fig. 5).

To allow the removal of a deep, massive, concrete pier under another elevated column that had been previously underpinned during the construction of the Municipal Building, many studies were made. The usual design would be to use heavy-section beams set through holes in the concrete pier, and carried on towers to subgrade. Due to complications in the designed location of the subway steel, it was found more economical to use six inclined steel legs with a wide spread at the bottom and with each leg cut into the concrete foundation just below roof level of the future subway, and the whole braced as a unit as shown by Fig. 6. The six legs were "pretested" simultaneously against concrete pedestals, thus taking the whole column load of about 370 tons and allowing the removal of the massive base prior to the erection of the subway steel.

A variation of the above method was the use of inclined steel batter piles in conjunction with vertical piles to support the masonry foundation below a row of columns supporting part of the Brooklyn Bridge approach. Here the inclined piles were jacked through the ground in long sections on a batter templet for a distance of about 25 ft. to subgrade, unsanded, filled with concrete and then "pretested" to 100 tons each against the masonry above.

In underpinning buildings, each, with its computed column and wall loads, was treated as a separate problem. Based on several soil tests, a loading of about 5 tons per square foot of sand was used for pier underpinning in pits. For 14-in. concrete-filled steel cylinders on sand after testing to a 50 per cent overload and wedging by the "pretest" method (patented), a working load of about 40 tons was used. Where heavy loads were to be picked up to avoid overlapping effects, the steel cylinders were tested in groups of four to six (patents on this process are pending).

The most difficult underpinning problem was that of the old Times Building, a massive masonry structure 18 stories high. The footings of the building were inverted arches, a type peculiar to massive buildings about 50 years ago. Some of the column loads were about 1,200 tons. At this point the best stratum that it was practicable to reach was a thin layer of gravel interbedded in the sand a few feet below subgrade. As shown by Fig. 7, the underpinning consisted of three rows of 14-in. steel cylinders jacked below subgrade and "pretested." A view of the supports is given by Fig. 8. The cylinders were electrically welded shells 4 to 6 ft. long and No. 10 gage. They were placed in horizontally sheeted pits which were gradually enlarged so as to extend entirely

FIG. 8—UNDERPINNING PILES CARRYING EAST WALL OF TIMES BUILDING

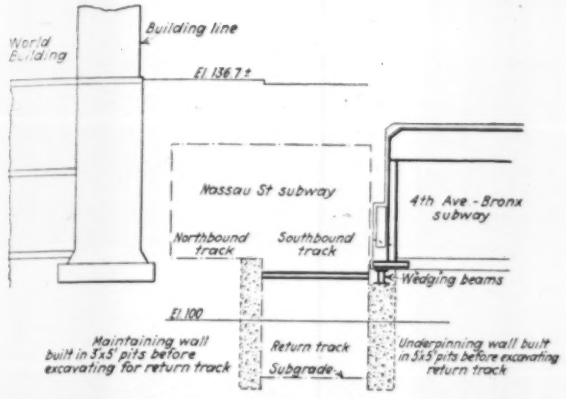


FIG. 9—UNDERPINNING AT WORLD BUILDING

below the front row of footings. The success of this class of work depends mainly upon the following two factors: the care with which the pits are excavated so as to lose no ground either under the footings being underpinned or neighboring footings, and the proper "pretesting" and loading of each pile or cylinder so that it permanently retains its load, such testing being followed up by group jacking. With proper and skilled work the experience is that only the footings along the building line need be carried by underpinning operations below subgrade and no slope lines are therefore considered. It is proper to state here that buildings so underpinned require substantial lateral support, which in the case of the Nassau St. subway was provided by transverse H-beams and other bracing. The criterion of successful underpinning is the success in limiting the distribution of movement of the building or structure to an amount which causes little or negligible damage—that is, it is primarily to safeguard the building; it is not to avoid settlement entirely, for slight settlements occur in the best of underpinning operations.

Along the east side of Nassau St. from the Brooklyn Bridge to Beekman St., the buildings, including the massive World, Tribune and Sun buildings, were just far enough back to be safe-guarded by cut-off or protection walls in lieu of underpinning (Fig. 9). These were 3-ft. walls placed in horizontally sheeted pits about 3x5 ft. They were used where the slope line for the adjacent lower exterior corner of the subway drawn on a slope of 1 on ½ horizontal failed to intersect the front wall footings, on the theory that it was better to allow the ground to continue to support the load undisturbed than to attempt direct underpinning. This has been justified by the results achieved—no movement of buildings so protected has as yet been noted.

To date 90 per cent of the excavation has been removed and the results are such as to justify the belief that the damage to buildings and structures underpinned would be very slight. There have been installed a total of 27,000 lin.ft. of underpinning piling. On the work, at the maximum, a force of about 625 men were engaged, including 75 underpinners.

Personnel

The Nassau St. subway is being built under contract with the Board of Transportation, Robert Ridgway, chief engineer, by the Marcus Contracting Company, for which Spencer, White & Prentis are the managing engineers. H. M. Hale is resident directing engineer for the contractor.

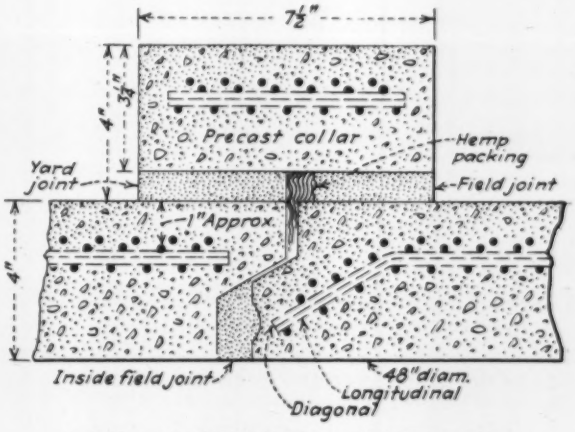
Spun Concrete Pipe Conveys Water Supply Under 145-Ft. Head

Three-Ton, 8-Ft. Sections Trucked 115 Miles—Dry-Cement-Calked Joints Successful—Curves of 120-Ft. Radius

By H. Hawgood
Consulting Engineer, Los Angeles, Calif.

A CONCRETE pipe line 48 in. in diameter designed for a maximum working head of 145 ft. was recently put into service by the Escondido Mutual Water Company in southern California, replacing a 20-in. steel pipe line laid in 1914. The new line, which is part of extensive improvements to meet increasing water and power demands of this company and also to convey water for the San Diego County Water Company, is of centrifugally processed concrete pipe and is 2,510 ft. long, beginning at a 50-in. steel outlet pipe from Lake Wholford and terminating in a manifold at the head of the Bear Valley power plant penstocks. After leaving the power plant the water is distributed for domestic and irrigation purposes. Lake Wholford, where the water supply is stored, has a storage capacity of approximately 7,500-acre-ft.

The pipe line was laid along a steep, rocky mountain side in 8-ft. lengths with shorter closing sections as needed. Ends of pipe sections laid on curves were made at an angle of 87 deg. with the pipe axis, corresponding to a center line radius of 120 ft. The line was located



DETAIL OF JOINT SPUN CONCRETE PIPE

with a total of fourteen horizontal and vertical curves, aggregating a total curvature of 328 deg. The curves constitute 22.4 per cent and the tangents 77.6 per cent of the total length of the line, the greatest deflection in any one curve being about 48 deg. To minimize the number of curves, changes in alignment and gradients were made, wherever practicable, at the same point of intersection.

Each section of pipe, 8 ft. long, 4 in. thick and 48 in. inside diameter, is reinforced with a cylindrical cage composed of three spiral windings of No. 6 wire, combined with 32 longitudinal and sixteen diagonal wires of No. 10 gage which are formed on a collapsible drum. The longitudinal and diagonal steel is placed between the first and second layers of spirals, which are wound in opposite directions. The second layer depresses the

longitudinal steel to lock the cage firmly together. The spirals are all pitched thirteen turns to the foot, thus giving a steel area of 1.61 sq.in. per foot of pipe. Details of the reinforcing are shown in the accompanying drawing.

Connections for 6-in. and 2-in. screw pipe were made by inserting into the reinforcing cage standard screw pipe couplings turned to a radius of 24 in. at the inner end to conform smoothly to the interior surface of the pipe. Into these couplings $\frac{5}{8}$-in. studs were tapped projecting 3 in. into the pipe walls. Eight studs were used on the 6-in. and six on the 2-in. couplings. A counterweight was inserted into the cage diametrically opposite to the coupling to preserve centrifugal balance during spinning.

The mix used was 1 : $1\frac{1}{2}$: $1\frac{1}{2}$, the coarse aggregate being crushed rock, $\frac{1}{4}$ to $\frac{1}{2}$ in. in size. Out of each day's

CURVES CONSTITUTE 22 PER CENT OF THIS LINE
Pipe covered between joints and allowed to settle before dry calking with neat cement

run one pipe was tested to 75 lb. per sq.in. (173-ft. head) when seven days old. The weight of each 8-ft. section is 6,088 lb.

Jointing the large diameter concrete pipe for service under high head presented one of the major problems to the contractors, who furnished and laid the pipe under guarantee of watertightness. Calked dry joints were selected because of the success that has attended their use for cast-iron and other pipe. It is doubtful whether water penetrates far, if at all, into joints that have been well made by the dry-calking process. Instances of such joints being opened after service bear out this assertion. Both yard and field joints were made with dry, neat cement tightly calked, with the outer end of the joints wetted sufficiently to set. Poured joints would have required less time to make but would involve risks, perhaps more or less imaginary, for high heads. There was the risk of incomplete filling, since to avoid pockets it would be necessary to pour the joint on one side with a mortar sufficiently fluid to flow freely up the other side of the joint to a closure.

Shrinkage on the drying out of mortar of such consistency in poured joints would be inevitable and cracks would occur unless the tensile strength of the mortar, together with the bond between mortar and pipe, was adequate to resist the shrinkage tension. Expansion from the heat of hydration is probably negligible by reason of the heat-absorbing capacity of the relatively large mass of cool concrete surrounding the mortar. With the increasing use of large concrete pipe there is need for a thorough investigation of the physical properties of joints of various types.

The Escondido line has proved satisfactory thus far, although due to low level in the reservoir it has been tested to only 82 per cent of the maximum head. No leakage has developed and there has been no evidence of weakness which would suggest that there would be trouble at full head.

The greatest static head that can be brought upon the pipe is 134 ft., the purpose in designing for 145 ft. being to give a margin against surge effects. Surge is limited by two relief pipes, which were constructed from a part of the salvaged 20-in. steel pipe line, laid from the top of the manifold, at head of penstocks, up the mountain side with free discharge into a gulch at the elevation of the surface of Lake Wholford. Additional protection is afforded by relief valves at the power house.

The need for air relief valves on the line is eliminated by the high compressive strength of the concrete pipe, which prevents danger of collapse from atmospheric pressure in the event that there should be a sudden emptying of the line.

The pipe was made by the Hume centrifugal process in Los Angeles and hauled to the job by truck and trailer. Of the 114-mile haul, paved highway extended 111 miles to the foot of the mountain grade at Escondido, where the pipe was unloaded to platforms of truck-body height. From these platforms each pipe was rolled onto a light truck and taken up the $1\frac{1}{2}$-mile grade, rising 550 ft., to a point where the road crossed the pipe

TRACTOR USING PIPE TRENCH FOR ROADBED
Section arriving on special carriage to be placed by crane

trench, at about mid-point. At this second transfer point the pipe was rolled from the truck onto a special carriage and pushed by light tractor to the point of laying, using the trench floor as a roadway. Pipe laying progressed from both ends of the line toward the center. The sections were lifted from the carriage by a traveling gantry crane, shown in accompanying illustration, and set into position. The average time of a round trip for each tractor and carriage was about fifteen minutes and the average rate of delivery was 27 sections (216 ft.) per day. To allow for any possible settlement, the

line was practically completed before the field joints were made.

The pipe was covered with dirt between joints as quickly as practicable. Wet cloths over the joints were also used as a protection and no expansion or contraction troubles were experienced from diurnal changes of temperature.

No tests have as yet been made of the frictional resistance and discharge capacity of the pipe, but from the results obtained at Riverside, Calif., with 42-in. pipe of same type it is estimated that this 48-in. concrete pipe has the same capacity, by the Scoby formula, as the 50-in. riveted steel pipe (when new and clean) which was originally contemplated. The first cost of a 50-in. steel pipe would have been less than that of the 48-in. concrete pipe, but the latter was chosen primarily because of its longer life.

The Bent Concrete Pipe Company manufactured and installed the pipe. The work was in charge of J. B. Dixon, superintendent and secretary of the Escondido Mutual Water Company, the interests of the San Diego County Water Company being represented by its chief engineer, George Cromwell. The writer planned the work and exercised general supervision.

Motor Truck for House-Connection Gangs, Richmond, Va.

Push Cart Displaced by Tool Box on Ford Truck, Then by Improved Truck for Tools, Pipe, and Gangs of Men

By G. W. James, Jr.
Richmond, Va.

A MOTORIZED plumber's truck is rapidly replacing the old push carts formerly used to distribute material to the city gangs laying water and gas services at Richmond, Va.

The first development of the unit from a design by George H. Whitefield, director of utilities, consisted of a specially designed tool box mounted on a Ford truck. The center of the box carried shovels, bars and picks. Access to this section was provided by a door in the rear. On each side and above the central tool box bins were built for fittings and small tools. The sizes of these bins were adapted to the material to be carried in them and access was by doors on both sides and on the top.

MOTORIZED TRUCK FOR HOUSE-CONNECTION GANGS, RICHMOND WATER-WORKS AND GASWORKS

OLD PUSH CART USED BY HOUSE-CONNECTION GANGS

In addition, the rear of the truck was provided with a pipe vise, and side brackets were installed for transporting pipe.

This truck, which soon proved a time saver as well as allowing for a wider distribution of gangs, led to a more modern unit designed along the lines of an express truck. In this, ample seating space has been left to house a gang unit in case of rain as well as to transport the men to the jobs. Bins are located over the seats, the seats being hinged in order to permit of rapid storage of tools.

Other bins are located with doors opening on the outside, and the space not occupied by the interior seat bins is utilized to store picks and shovels. Racks and bins for lanterns, blow torches, etc., fill the space immediately in the rear of the driver's seat. An opening has been left in the upper and lower outside bins in which pipe may be racked. The upper portion of the truck body is fitted with heavy wire screens which, together with the rear doors, insure protection against theft of equipment.

INTERIOR OF HOUSE-CONNECTION MOTOR TRUCK
Showing tool space beneath and beyond seats for men.

FIG. 1—TYPICAL ARKANSAS DRAINAGE DITCHES
At left—ditch No. 6; note flat slope. At right—ditch No. 31.

Extensive Land Drainage Work in Arkansas

Two Drainage Districts Rehabilitated as One Project of 340 Square Miles —Rainfall and Floods—New and Redredged Ditches— Pumping Needed for One Section

By H. W. English and Albert S. Fry
Morgan Engineering Company, Memphis, Tenn.

A DRAINAGE reclamation project now being completed in the eastern part of Mississippi County, Arkansas, involves the enlarging and reconstruction of drainage systems completed fourteen years ago by Carson Lake Drainage District No. 8 and Grassy Lake and Tyronza Drainage District No. 9. The area is 217,420 acres, or 340 square miles, and 416 miles of drainage canals are included in the reconstruction, requiring the excavation of 18,077,000 cu.yd. of earth. Typical views of the main ditches are shown in Fig. 1.

Topography—The land is within the alluvial valley of the Mississippi River and is protected from floods by the U. S. government levee. The interior is comparatively flat, with a slope of about 1 ft. per mile, but the land rises around the rim of the flat area, along the Mississippi River on the east and along Little River on the west, the slope increasing to a little more than 3 ft. per mile along the Mississippi River bank.

The reclaimed beds of Carson Lake and Young's Lake, in the southeastern part, originally had outlets into the Mississippi, but these outlets were closed by the levee and the lake lands became inland basins, to be reclaimed later by new outlets cut through the surrounding higher lands. A few "sunk lands" within this area were formed during the New Madrid earthquake in 1811 and 1812, when certain portions were depressed below the general level. The Tyronza River, which heads in the southwestern part, is the only natural drainage outlet of importance.

Original Drainage Systems—The two original drainage districts, formed in 1911, constructed 375 miles of open drainage channels and 25 miles of spoilbank as protection against overflows from Little River. This construction, completed in 1915, provided three outlets, ditches 31 and 40 discharging into the Tyronza River and ditch 6 into Spear Lake, as shown on the plan, Fig. 2. Below Spear Lake this outlet was continued to the St. Francis River by a cutoff channel with spoilbanks having no openings, so that when floodwater was above the natural ground level between the spoilbanks, adjacent lands were not overflowed. Lateral drains were located as a general rule not more than a mile apart. When these improvements were carried out, only 25 per cent of the area was cleared, the remainder being virgin or cut-over timber. During the ten years following construction, 75 per cent of the lands were cleared and put under cultivation. The majority of these lands being in a high state of cultivation, the owners were able to pay taxes for additional drainage which it was not economical to provide originally.

When the original drainage systems were started, in 1912, floating dipper dredges were the most economical means of excavating earth for this class of work. Although these machines were best from the standpoint of economy, their use resulted in unbalancing the hydraulic features of the plan, because even the smallest size of floating dipper dredge dug the lateral ditches larger than the hydraulic requirements of the system as a whole, whereas they dug the outlet ditches to the designed sizes. During heavy storms, therefore, the oversize lateral ditches delivered more water than the outlet ditches could care for, causing overflow and consequent injury of adjacent lands.

Deterioration took place in the ditches which it was impossible to prevent or to repair by ordinary methods of ditch maintenance. The floating dredges could not dig stable side slopes, and the capacities of the ditches were reduced by slides during the stabilization of the slopes. Farm drains washed in material that formed bars. These causes, together with the natural processes of weathering, in many cases had filled in and raised the bottoms of the ditches to such an extent that they did not furnish adequate outlets either for tile or for open farm drainage.

Rainfall and Floods—In the design of a drainage reclamation system, the intensity and frequency of individual storm rainfall are of importance because sufficient capacity must be provided to carry the runoff without overflow from those storms which occur often enough to prevent profitable cultivation of the lands if adequate drainage systems are lacking.

In March, 1919, and January, 1920, occurred two of

the most severe storms recorded in this territory, producing flood conditions and resulting in unusually high stages in the Tyronza River. The only storm of appreciably greater intensity was that of Oct. 4 to 6, 1910, which ranks as one of the most severe on record in the entire Central and Eastern states. Rainfall maps of the three storms are shown by Fig. 3.

During the high water of March, 1919, discharges of the main outlet channels were measured with current meters. High-water elevations were secured, from which storage over the land was estimated. From these data was estimated the runoff necessary to provide for in a reclamation system designed to prevent overflow during such a storm.

Runoff Basis—For the design of the new drainage system the upper runoff curve in Fig. 4 was adopted. This is based on ten years' experience with the original ditches, a study of the lack of capacity of these ditches to carry the runoff from large storms and the probability of occurrence of such storms, together with the experience of other drainage districts in the Mississippi Valley. There was also the fundamental consideration that the outlet channels must have capacity to carry the runoff delivered by the oversize laterals of the original drainage systems after these laterals were reconstructed in good condition.

The runoff provided gives complete drainage to agricultural lands for such heavy storms as those of March, 1919, and January, 1920. It will also greatly reduce the damage and time of overflow for even such severe but rare storms as that of October, 1910, for which it is not economical to provide channels to carry the entire runoff. The adopted runoff exceeds considerably that which has been customary in drainage districts in this locality.

The lower curve in Fig. 4 shows the runoff used for the original drainage district No. 9. The new curve provides not only a large increase in capacity, but for areas less than 30 square miles it is of different shape. This is due to experience having shown that the old curve provided too great capacity for small areas, resulting in an unbalanced drainage system.

The New Plan—The redesigned plan includes 108 miles of enlarging and extending outlet channels, improvement of the interior drainage system by cleaning out and redigging 210 miles of existing lateral ditches, 24 miles of channel clearing and 74 miles of new lateral ditches. This work is shown in Fig. 2.

Outlet Channels—Both the St. Francis River outlet of ditch 6 and the Tyronza River outlet of ditch 31 have been enlarged to form the primary outlet channels. They extend beyond the boundaries of the project, 7½ and 13 miles, respectively, in order to maintain the high-water surface at the lower end of the project at or below ground surface, thus preventing overflow. The base widths of the ditch 6 enlarged outlet varied from 33 ft. to a maximum of 84 ft., which, with depths of flow from 10 to 12 ft., gives a range in top widths from 73 to 132 ft.

Ditch 31 was enlarged to 22 ft. base width and 62 ft. top width at its beginning and increased in size downstream. The old channel of Tyronza River, which is the lower end of this ditch, was enlarged to a maximum base width of 125 ft., with a depth of flow of 15 ft., making the new channel top width about 185 ft. Because of the flat character of the land, it was necessary to design the lower ends of these outlet channels with water-surface slopes of ¼ and ½ ft. per mile. Slopes on the outlets generally did not exceed 1 ft. per mile.

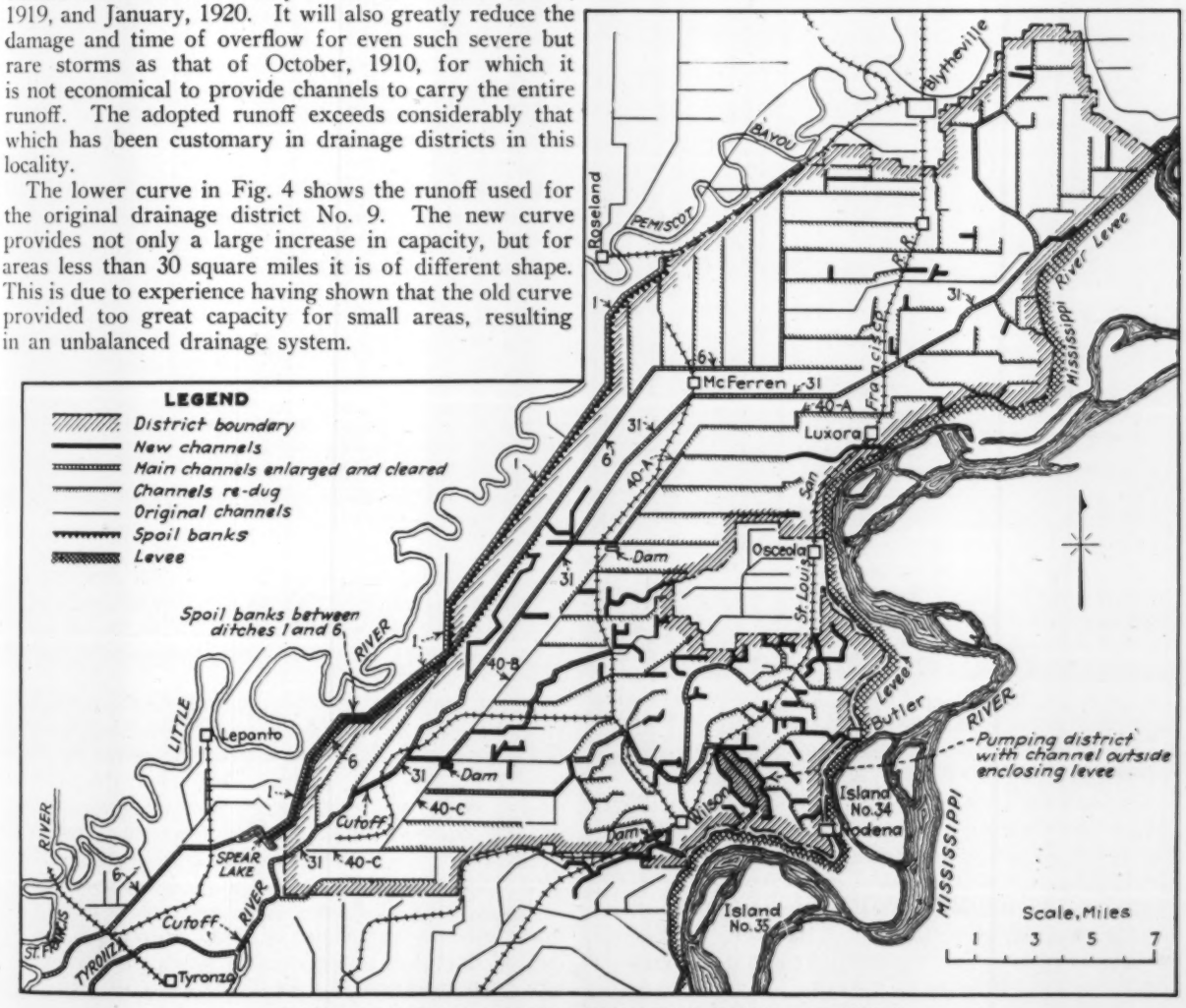


FIG. 2—MISSISSIPPI COUNTY DRAINAGE DISTRICT, ARKANSAS

Secondary outlets varied from 16 to 62 ft. in bottom width and 56 to 102 ft. in top width.

Split outlets were used on the lower ends of some secondary outlet channels and on the ditch 6 outlet to Spear Lake. Under this plan, part of the flow from the main outlet ditch was diverted through an existing canal of the old drainage system. The old canals were not enlarged, but were cleared of tree growth and drift so that their full capacity could be utilized to lessen the flow in the main outlet beyond the point of diversion.

Since the original drainage works were built, the need of protecting the land from Little River overflows had been lessened by the construction of a levee along Big Lake and the Right-Hand Chute of Little River by an adjacent drainage district. With this menace reduced, it was possible to cut through the spoilbank which protected against Little River floods, about 9 miles above the outlet into Spear Lake, in order to utilize the ditch from which the spoilbank had been built as an auxiliary channel. Along this particular reach the slope of the water surface in ditch 6 is only $\frac{1}{4}$ ft. per mile, considerably reducing the amount of enlargement. For several miles above Spear Lake the high-water surface in ditch 6 is a few feet above natural ground, and overflow is prevented by spoilbanks having no openings.

From Spear Lake to the St. Francis River the outlet channel was originally constructed large enough to carry not only the water from ditch 6 but also floodwater from Little River. With the necessity of carrying this floodwater lessened, the channel had sufficient capacity without enlargement to carry the runoff required by the redesigned system. This channel operates as a high-level canal, as under the original system.

Below the end of the old excavation for ditch 31 the natural channel of Tyronza River was enlarged through and beyond the project, two cutoffs being made to straighten out hairpin bends. The new excavation was planned to produce as straight a channel as possible and to make the curves long and easy. Below this excavation the river channel was cleared for a width of approximately 200 ft. for about 6 miles, so that the water level is not raised over previous flood heights. In this clearing, large trees were left at intervals of from 25 to 50 ft., with the intent that they would so shade the river banks as to prevent small growth from springing up and reducing the carrying capacity of the channel. This cleared and tree-lined channel is shown in Fig. 5.

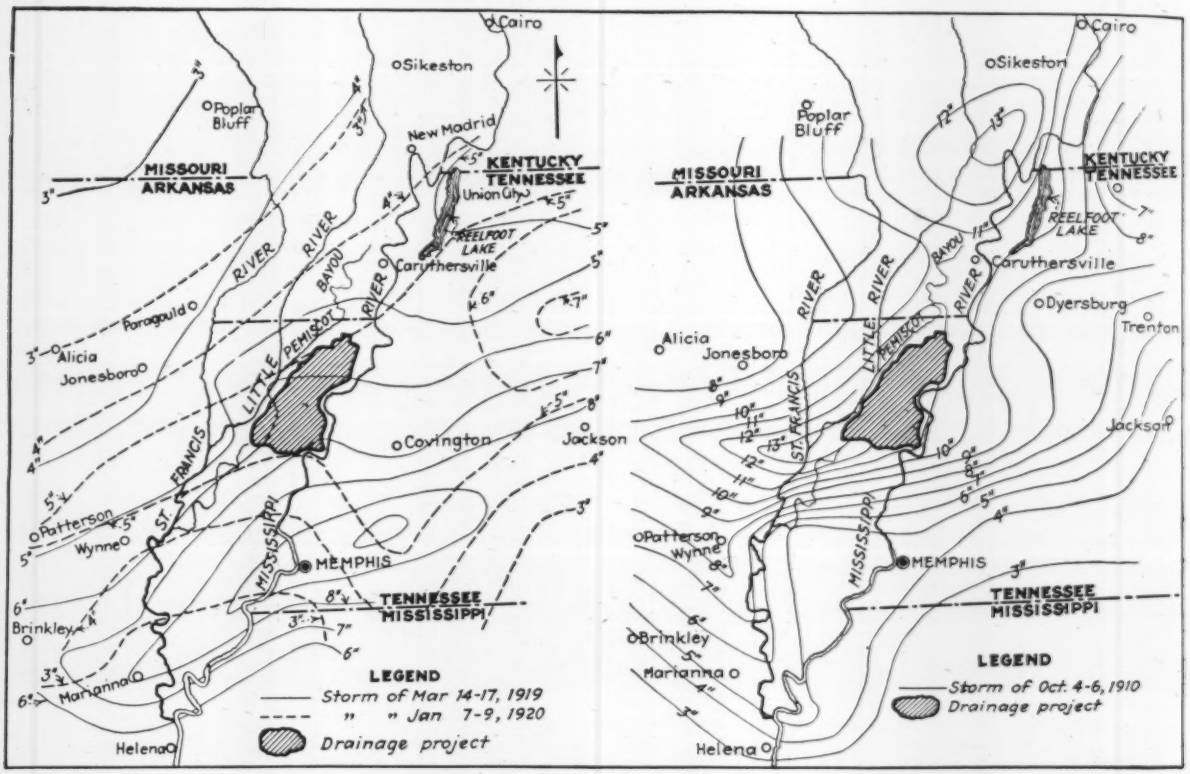


FIG. 3—STORM RAINFALLS IN MISSISSIPPI COUNTY, ARKANSAS

The lower reaches of ditch 31 and Tyronza River were designed for a capacity somewhat greater than that determined by the runoff curve. This was done because the channel is located through the lowest lands in the district and because it was impracticable to control the capacity of some of the original lateral ditches to that required by the runoff curve.

About a mile east of ditch 31, ditch 40 was constructed originally as a primary outlet in the Tyronza River. In the redesign this ditch was divided into three secondary outlets by two earth dams. The upper two sections, ditches 40-A and 40-B, were diverted into ditch 31 by new channels, while the lower section, ditch 40-C, continued on its original location to the Tyronza River. Under this plan the upper ends of these separate sections are simply lateral drains. The lower parts of the two upper sections were enlarged, but the lower section of the old ditch had ample capacity when cleared and put into good condition.

The lateral ditches which drain from the east into ditch 40 begin in the higher lands along the Mississippi River, where the ground surface slope is steepest. As these ditches deliver more water than called for by the new runoff curve, it was necessary in the redesign of the three sections of ditch 40 to provide excess capacity.

Interior Drainage—To provide satisfactory interior drainage, the original lateral canals were cleaned out and deepened to give each plantation an outlet of adequate size for either open or tile farm drains having a depth of 8 ft. Some new lateral ditches were constructed to improve drainage in local areas or to comform to the new plan. For these, a size was adopted with 4 ft. base width, 8 ft. depth and side slopes of 1 on 2. In some places this is larger than required, but in such cases the tributary drainage area is so small that it cannot produce enough runoff to fill the ditch and cause the system to become unbalanced.

Pumping Plant—The bed of Young's Lake is too low to be drained completely by gravity when the outlet channels carry floodwater at maximum stages. The 700 acres of lake lands were therefore inclosed within spoilbanks serving as levees, and the ditches from which the spoilbanks were built intercept the runoff from the surrounding higher lands (see Fig. 2). At the lower end of the lake a concrete sluiceway and a pumping station were constructed. During high water in the outlet channel, automatic gates close the sluiceway, and the runoff from within the inclosed area is pumped.

Borings at the side of the pumping plant disclosed 10 ft. of black gumbo underlain by pure sand to a depth exceeding 50 ft. With this sand stratum it was not practical to prevent underflow by a vertical cutoff, so the sluiceway was designed with a length based on a ratio

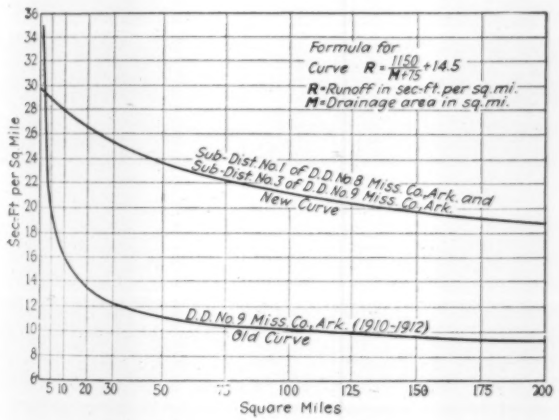


FIG. 4—RUNOFF CURVES

of water travel to head of 20 to 1. It consists of two lines of 36-in. precast concrete pipe laid on a wooden cradle at about the elevation of the top of the sand. Earth was filled over the pipe to the grade of the spoilbanks.

The pumping plant, on the upstream end of the sluiceway, has a concrete substructure founded on piling, with a galvanized-iron housing for the motors. There are three 24-in. vertical box-type screw pumps, each direct connected to a 25-hp. motor and equipped with an automatic starting device. The pumps are of the wet-pit type and require no priming. They have a total capacity of 20,000 g.p.m. at a static head of 4 ft., which provides 1½ in. of runoff from the leveed area.

Maintenance Considerations—The new drainage channels were planned and constructed with maintenance in mind. Experience has taught that the cost and difficulties of maintenance may be controlled and lessened in many cases by proper design and construction of the cross-section of the channels. Flat side slopes were used on all the work as one means of reducing deterioration and maintenance costs. Probably on no other large drainage project was more attention given to the finishing of the canal slopes by large excavating units in earth excavation where permanent slope protection or paving was not contemplated.

In the original channels the sides became stable gen-

FIG. 5—CLEARED CHANNEL OF TYRONZA RIVER
Note trees left to shade banks.

erally at slopes of 1 on 2 for the material encountered, and this slope was specified for practically all of the new work. For most of ditch 6, one of the main outlets, through less stable material, a slope of 1 on 3 was used in the enlargement. On the lower Tyronza River cutoff, the depths ranged up to 19 ft., and side slopes of 1 on 2½ were used.

In redigging the laterals, the new ditch cross-section was so fitted to the old section that the existing banks, stabilized through several years of weathering, were disturbed as little as possible. The final shape of the new cross-section closely approximates a channel 6 ft. wide on the bottom with side slopes of 1 on 1½ to 1 on 2, for the entire ditch bank. Since the construction period, for the most part the slopes have proved stable.

To minimize the formation of bars in the ditches due to material carried in by farm ditches, inlet ditches were excavated back 50 to 75 ft. from the main ditch, on the same grade as the latter and with an 8-ft. berm on each side. As a further aid, openings in spoilbanks for farm ditches were limited to the smallest possible number to give the necessary drainage and not cause ponding behind the spoilbanks.

Engineers—This drainage reconstruction project was planned under the direction of the Morgan Engineering Company, Memphis, Tenn., with L. L. Hidinger, president, in direct charge, and A. S. Fry as assistant engineer. H. W. English was resident engineer on the major part of the work, and J. T. Olsen is resident engineer on the part now being carried out.

The construction plant and methods, with a fleet of 35 excavators and the careful dressing of flat side slopes, will be described in a later article.

Steel Ties for German Railways

In track repairs now being made on a large scale in Germany there is general use of steel ties and a heavy ballast bed, according to the *Railway Gazette*, London. The rails are said to be of about 100-lb. section.

Construction Camp and Program for San Gabriel Dam

Start 1,500-Man Camp With 500-Man Unit—Contract for Feeding, Camp Operation, Separate Excavation Started March 11

By E. C. Eaton
Chief Engineer, Los Angeles County Flood Control District

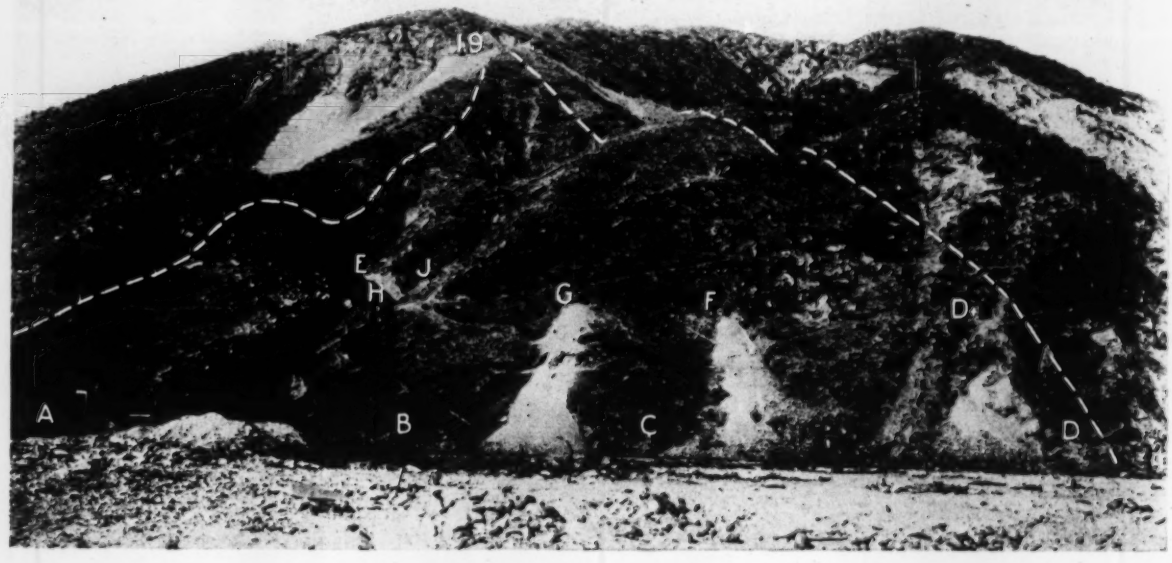
With the first blast in the foundation on March 11, excavation was started in an extensive way on the San Gabriel dam, which is being built in southern California by the Los Angeles County Flood Control District. This structure will require the unprecedented mass of approximately 4,000,000 cu.yd. of concrete and is to be completed in six years under a contract the features of which were described in *Engineering News-Record*, Nov. 15, 1928, p. 733. The general contract provides that the district furnish camp buildings and arrange for the housing and feeding of the men under separate contract. Problems of camp layout have occupied the attention of the district engineers for the past few months and facilities are now completed for 500 men, with designs which can be expanded to accommodate 1,500.

The general contractor has organized for the first year's work, which will consist mainly of rough excavation before concrete work begins, and stripping operations are proceeding at a rate of about 100,000 cu.yd. per month.

Immediately following the award of the general contract on Dec. 7, 1928, the district issued plans for the first unit of the camp. The general location is about 35 miles from Los Angeles and 10 miles from the nearest city, the camp being about 1,200 ft. downstream from the dam site. Cut-and-fill excavation was made at the camp site to permit the major portion of the camp to be located on moderately sloping ground. This permitted a plan more economical of space with a better layout for camp roads.

The housing facilities on April 15 occupied by 300 men consisted of 50 eight-man bunk houses, 30 four-room family houses, dining room and kitchen capable of feeding 1,000 men, recreation building, office and numerous smaller buildings. The bunk houses are 17x24 ft. in plan, with accommodations for eight men, and cost $505 per building. The family houses, 26x29 ft., with four rooms, were built for a contract price of $1,286 per house. Each of the bunk houses is provided with a sprinkler nozzle on the roof, permitting flooding of the buildings for fire protection and allowing the roofs to be wet down during the hot summer months.

A modern sewage and septic tank system was installed by the district. The sewage system is designed to handle only wash water, since complete chemical toilet facilities are provided throughout the camp to eliminate the possibility of river water pollution. The sanitary units for each 140 men include seven chemical toilets, as well as shower and washstands with hot and cold water.



VIEW OF WEST ABUTMENT WITH OUTLINE OF DAM
Letters mark coyote holes driven to solid rock. Overburden is blasted into streambed for easy handling.

The camp water supply consists of a triplex pump with a 150-g.p.m. capacity against a 610-ft. head pumping from a sump in the streambed about 1,200 ft. above the dam site. All water is chlorinated and delivered to a 42,000-gal. tank at an elevation 150 ft. above the camp. This pressure head is reduced for domestic use, but a bypass valve permits full pressure to be placed on the fire hydrants in case of fire. As an added protection the camp water system is connected to the contractor's pumps and 200,000-gal. tank for emergency use in case the former system should fail during a fire.

Being located within a national forest, particular attention is given to prevention of forest fires; the camp is encircled by a fire break 300 ft. wide, and construction foremen are put through a fire drill once a week by a resident Forest Service officer.

The contract covering commissary and camp operation includes rigid specifications for the best grade of food

in ample quantity with a provision for cancellation by the district on fifteen days' notice. The men are housed and fed at a price not to exceed $1.36 per man per day, which includes heating, lighting, janitor service, beds and sheets (but not blankets), towels and soap. The service includes a change of sheets once a week. Results of the first three months' operation of this arrangement have been entirely satisfactory and warrant the prediction that the system of having commissary and housing accommodations in the hands of concerns which devote their entire energy to this work will become more prevalent in future large construction work.

UNIT OF EIGHT-MAN BUNK HOUSES
Dining hall of 1,000-man capacity in rear, with recreation hall to the right.

Work is carried on without interruption throughout each 24-hour period, employing three shifts each on a schedule of two four-hour work periods with a four-hour rest period between. For example, a man goes to work at 5 a.m., works until 9 a.m., then after being off duty for four hours goes to work at 1 p.m. and works until 5 p.m.

Power for camp and construction equipment is provided through a 30,000-volt transmission line 12 miles long with a capacity of 8,000 hp., the camp being completely electrified, including electric stoves and heaters. A five-circuit telephone line connects the camp to the local system.

Transportation facilities consist of 10 miles of standard-gage railroad built by the district one year ago and turned over to the contractor for operation and maintenance. This railroad follows generally up the course of the riverbed with maximum curves of 24 deg. and compensated grades of 2 per cent. The roadbed was ballasted with disintegrated granite wide enough to make a 15- to 20-ft. road beside the track, allowing highway and truck transportation in addition to the railroad. Traffic control is maintained by the district.

Actual construction work at the dam site thus far has been confined to rough excavation on the west abutment, where it is estimated 600,000 cu.yd. will be removed. About a year will be required for this work on both abutments before concreting will begin. The method of excavating in the canyon walls near streambed consists of driving "coyote hole" tunnels of 3 ft. x 4 ft. 6 in. section into the hill on level grade until the heading shows indication of sound rock. Cross-cuts are then started in both directions and pockets are loaded with black powder on a computed load varying from ¾ to 1¾ lb. per cubic yard, depending upon the material and the location of the holes.

After all the shots have been computed by powder experts for the contractor and agreed to or modified by the district's engineer, in order to avoid any possibility of shattering sound rock which would be suitable for foundation purposes, the holes are shot in groups. Every precaution is being taken to avoid the shattering of sound material, although in many instances apparently sound faces have proved to be merely ledges with seams and crevices beneath. The total footage in the first fifteen coyote holes and cross-cuts drilled and fired up to May 15 was about 2,500 ft., the largest individual shot being firing of eight holes loaded with 23 tons of powder.

The material brought to the streambed by these shots is loaded by 2-yd. electrical shovels into 30-cu.yd. side dump cars. Trainloads of three cars are hauled by 30-ton gasoline locomotives on standard-gage track a distance of about 2,000 ft. downstream, where they are dumped parallel to the channel and leveled off by dragline and power shovels.

Sluicing is resorted to in order to loosen the overburden broken by the main shooting operation. Water from a pond 1,500 ft. upstream is pumped through a 12-in. welded pipe line to hydraulic giants. Pressures from 150 to 225 lb. are maintained at 2½- to 4-in. nozzles, whose discharge carries from 1,500 to 2,000 g.p.m. Sluicing is done thus far only about three hours during the night shift and there has been no difficulty in supplying enough material to keep the shovel and car equipment occupied during a sixteen-hour day.

Concurrently with the lower side hill excavation program, work is in progress on the excavation of the upper 100 ft. of abutment. This material is loosened by charges in down holes and taken out by shovels and trucks. This work is done principally to relieve the weight of top mass and to prevent excessive crushing and slides.

CLEARING OVERBURDEN FROM THE SITE
Removing 100,000 cu.yd. per month, a year of excavation work will be required.

During the month of April 110,714 cu.yd. was removed, and it is expected that the average for the next six months will be about the same; the contract price is $2.95 per cu.yd. The rock excavated consists chiefly of diorite which is decomposed by weathering and is traversed by joints and occasional shear planes, although there is no indication of recent fault movement. Some years ago about 14,000 lin.ft. of diamond drill boring was put down in order to determine the finished rock line.

Since no concreting will be done for about a year, details of the concreting plant have not been definitely formulated. The plant design layout when completed,

however, is to involve the most modern equipment yet employed for large-scale concrete production and will provide weight proportioning of all material, including cement and water. Cement is to be furnished by the district in bulk at the lower terminal of the district's railroad, 10 miles from the site, that point being reached by two main steam lines and one electric railroad.

The Los Angeles County Flood Control District operates under a special act of the California Legislature, under which the members of the county board of supervisors act as directors, with the writer as chief engineer for the district in direct charge of design and construction. The resident engineer for the district is E. B. Davey.

The magnitude of the work and the heavy financing necessary resulted in a combination of three experienced contracting firms incorporating under the name of Fisher, Ross, McDonald & Kahn, Inc., of Los Angeles. The four principals and their general manager act as a board of directors, the general manager in direct charge. Andrew Cassell is general manager and Harvey Slocum is general superintendent. The contract for feeding and housing is held by the Anderson Boarding & Supply Company, of Los Angeles, W. L. Anderson, president.

What Do You Pay For When You Buy a Load of Sand?

By E. R. Dawley

Associate Professor of Applied Mechanics, Kansas State Agricultural College, Manhattan, Kan.

When you buy a load of sand you may buy 21 cu.ft. of solid matter and 20½ cu.ft. of air and water. This article outlines one of the most common and yet widely disregarded problems of construction. A number of simple tests for determining bulking are included.

—Editor.

WHAT do you pay for when you buy a load of sand? A load of sand is ordinarily considered to contain 1½ cu.yd., or 40½ cu.ft. An experienced teamster will come very close to this value when loading his wagon. If the sand is dry, then you pay for what you ordered, 1½ yd. of sand. In ordinary construction work dry sand is rarely available and we are forced to consider the characteristics of damp sand.

Suppose we take a measure, say 1 cu.ft. in size, fill it with perfectly dry sand and level off the top carefully. We then have 1 cu.ft. of dry sand. Now let us dump this sand out in a large pan, being careful not to lose any of it, and add 2 qt. of water, mix until the water is uniformly distributed throughout the mass. Now try to put the damp sand back in the cubic-foot measure. You will have from ¼ to ⅓ cu.ft. of sand left after the measure is level full. The 2 qt. of water was approximately 4 per cent of the weight of the dry sand. This is approximately the amount of water which will give the maximum increase of volume, or bulking, as it is called.

If you had used a rather coarse sand, perhaps 3 per cent or 3½ per cent of water would give a greater increase in volume, while if the sand was very fine 5 per cent of water would probably give the maximum bulking. Experiments made by the United States Bureau of Public Roads show that the extent to which a given sand will bulk is dependent principally upon its nature and gradation, the manipulation and the amount of moisture present.

Sands used for concrete construction are almost never dry; in fact 3 per cent of moisture constitutes a barely damp condition. Even with 6 per cent of moisture there is no visible evidence of free water. It is probable that the usual stock pile of sand by some perverseness of nature contains that amount of moisture which will produce maximum bulking.

The following simple tests, which any one can make, will show that a bulking of 20 to 30 per cent is not uncommon. The first test requires a tin can and a stove. Fill the can with the moist sand from the interior of the stock pile. Scrape the top off level and set this can of sand on the back of a stove and allow it to dry for a day or so. When the sand becomes dry, carefully tap the can, or if the sand seems to be solid, dump it out on a newspaper and after breaking up the lumps replace it in the can. You will find that it does not fill the can by a considerable amount.

The second test is quicker than the first and is possible since it has been discovered that if you keep on adding water to dry sand, mixing thoroughly and measuring the volume after each addition you will find that after reaching maximum volumes at about 4 per cent water, the volume decreases until, when 20 or 30 per cent of water has been added, the sand occupies its original dry volume. The apparatus required for this test is an ordinary wide-mouth pickle bottle. Fill this bottle level full of the damp sand. Pour out this sand on a piece of paper and put two or three inches of water in the bottle. Now pour the sand back in, being careful not to lose any of it. If necessary to keep the material soaking wet add a little more water. You will find that all the sand goes in the bottle and still the bottle is not full. By changing the amount of water in the original sand you may determine the proper percentage of moisture required to produce maximum bulking.

Now to return to the original question, what do you pay for when you buy a load of sand? If the sand has bulked 30 per cent in loading, then you buy 31 cu.ft. of dry sand and 9½ cu.ft. of air and water. The average air voids in dry sand is about 33 per cent, so in this 31 cu.ft. of dry sand there will be 10 cu.ft. of air. In other words, an average load of sand contains about 21 cu.ft. of solid matter and 20½ cu.ft. of air and water.

Long Cars Developed to Transport Steel

As the result of three years of experimentation with twelve 65-ft. gondola cars in the transportation of long lengths of steel, the Pittsburgh & Lake Erie Railroad has ordered 100 additional cars of this type, the first of which are now being delivered. It is stated that the new gondolas effect a material saving in the transportation of lengths of steel too long to be loaded in the standard 46-ft. car. Formerly in such cases it was necessary to use two cars, and elaborate blocking was needed to permit the relative motion between cars necessary in train service.

Woods Hole Standpipe: Correction

The capacity of the inclosed standpipe for the Woods Hole section of Falmouth, Mass., described in *Engineering News-Record,* June 13, 1929, p. 941, is 0.32 m.g. The unit cost of $11.65 should have been given as per 1,000 gal. instead of per million gallons.

FIG. 1—HEAVY GRADING FOR YARD EXTENSION
Steam shovels working on both sides of hill. Shovel for stripping and well-drill rig for blasting are on top of hill.

Enlarged Freight Yard and Engine Terminal for Norfolk & Western Railway

Heavy Traffic Necessitates Doubling Capacity of Yard at Portsmouth, Ohio—Gravity Switching and Car Retarders—Smoke Exhaust System at Engine House

DOUBLING the size and capacity of a large freight yard while carrying on the yard business without interruption is a project which has been carried out successfully at Portsmouth, Ohio, by the Norfolk & Western Railway. In many projects for improved yard facilities an entirely new site is adopted, so that in both design and construction there is a free hand. But at Portsmouth such a plan was impracticable on account of topographic and operating conditions; therefore it was necessary to enlarge the existing site and facilities, which involved the purchase of a golf course and small residential property on low ground. Furthermore, the topographic conditions were unfavorable for the extension, and a large amount of excavation and filling was required to provide the necessary additional area. Some of the heavy grading is shown in Fig. 1. Work was begun in 1925 and was practically completed by the end of 1927.

Extensive use of modern methods and appliances is a notable feature of the yard as now revised. Besides the double-track hump for gravity switching for classification, which was already in use, the equipment now includes electro-pneumatic car retarders, power-operated switches, multiple-ladder yard entrances, pneumatic tubes for messenger service, and smoke-exhausting apparatus in the roundhouse. Large engine-terminal and car-repair facilities are supplementary to the general yard layout.

The old yards covered about 140 acres and had 70 miles of track. As reconstructed, they have 138 miles of track on an area of 270 acres, with a total length of 4 miles between yard entrance switches and a maximum width of nearly ½ mile. All this enlargement of area and extension and rearrangement of tracks, as well as the construction of new engine-terminal and car-repair facilities, had to be carried out in the face of heavy traffic movements.

As an illustration of the extent of the improvements, the capacity of the westbound receiving yard has been increased from 575 cars to 1,320 cars and that of the westbound classification yard from 1,141 cars to 2,456 cars, with 30 tracks, permitting 30 classifications of coal and freight for destination or grade of coal. In the latter yard, space is provided for ten additional tracks, making 40 tracks in all and raising the capacity to 2,720 cars. The eastbound classification yard has now a capacity of 3,180 cars on 30 tracks, but here also there is provision for future tracks.

Traffic Conditions—As Portsmouth is the junction of the lines running west to Cincinnati and north to Columbus, there is a general separation and classification of freight at this point. But the bulk of the work is the weighing and classifying of the heavy coal traffic moving west for general distribution and north for delivery to steamers at Toledo for the upper lake ports. This coal traffic represents about 75 per cent of the total freight movement westward, which is the direction of heaviest freight movement.

Daily movements at Portsmouth average five 4,800-ton trains in and out on the Cincinnati district and twenty trains of 9,000 tons in and out on the Columbus district. Normal trains average 105 loaded cars westbound and 125 empty cars eastbound. The yard service now provides for classifying 4,000 cars in 24 hours, as compared with 2,400 cars before the improvements were made.

General Layout—In view of the heavy westbound traffic into Portsmouth, the receiving yard is supplemented by a set of five pull-in or preliminary receiving tracks directly east of the westbound receiving yard, as it was not possible to secure additional right-of-way for more tracks south of the present location of this yard. Two of these pull-in tracks are long enough for two 100-car trains each, and three for one train each. With this arrangement, fleets of westbound trains can be taken off the main track when the yard is busy, so as to avoid congestion at the receiving yard and interruption to main line movement.

The main tracks divide and pass along the north and south sides of the yard. An existing viaduct near the west end of the yard governed the layout to some extent,

so that a considerable part of the eastbound yard is on a curve of approximately 5 deg. The general layout of the yard, with the relation of its several parts, is shown clearly in Fig. 2, which is not drawn to scale and does not attempt to give details of track numbers or track connections.

Westbound trains pass directly into the receiving yard, where the road engines are detached, the cars inspected and the switching lists made out. The twenty tracks converge upon two leads which pass over the hump and from which diverge the 30 tracks of the classification yard. Here the cars not only are classified but are made up into trains for departure, to be taken out directly by the road engines. This assembly into trains may be assisted by a trimmer engine working at the west end of the yard, and the caboose may be placed at the rear of the train by this engine or by the hump engine.

Adjacent to the westbound main track north of the classification yard is a six-track yard to receive westbound time-freight or through-freight trains which stop only for inspection and to change engines. Eastbound trains entering the west end of the yard pass by a long diagonal track to the eastbound yard of 30 tracks. Here the cars are classified and made up into trains by switching, assisted by grades on the ladders. Ten tracks in this yard are assigned for eastbound time-freight trains. North of this yard are tracks leading to a scale on which eastbound cars may be weighed, but weighing is required for comparatively few of these cars.

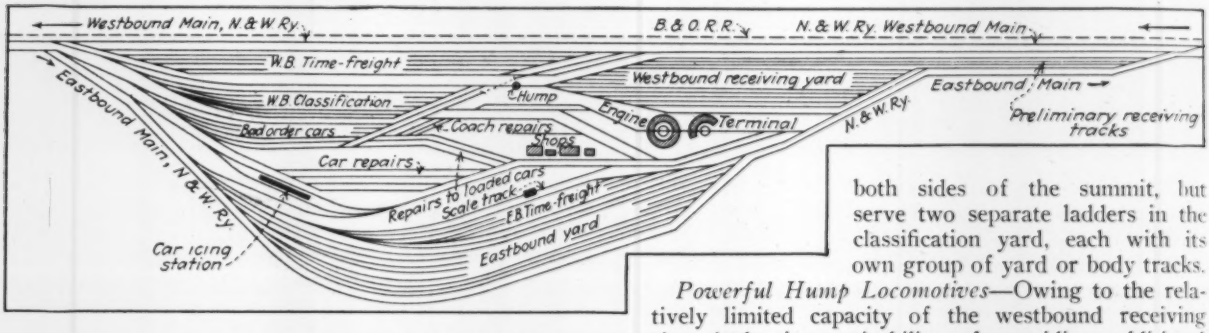


FIG. 2—YARD AT PORTSMOUTH, OHIO; NORFOLK & WESTERN RAILWAY

This plan shows the shape of yard and relations of its several parts, but is not drawn to scale and does not show number of tracks or details of track connections.

The main part of the eastbound yard consists of twenty tracks, with double ladders in the middle, each track holding 120 to 125 cars. The west end of the yard has individual switching leads from the beginning of the ladder to 1,400 ft. east in the yard. These leads have descending grades of about 0.3 per cent, which makes it easy to handle and classify 2,000 to 3,000 cars per day. Joining the empty-car yard with a separate ladder and separate switching lead is a ten-track yard for eastbound time-freight, built on a grade of about 0.4 per cent for 1,200 ft., which makes it convenient to classify all eastbound time-freight trains and build them into main-trackers or through freight trains for eastbound movement. All empty coal-car trains dispatched from the Portsmouth yard for movement east are classified for delivery direct to the entire coal field.

Switching Hump—Gravity switching is employed only for the westbound movements, as it was possible to provide assisting grades for engine switching on eastbound movements, as noted above. It will be seen from Fig. 3 that the hump profile is peculiar in having the heavier grades on the ascending side. This is due to the fact that the hump is formed entirely by filling, and it would have been expensive as well as unnecessary to make a long approach of uniform and easy grade.

From the receiving yard the grade rises at 0.24 per cent and then successively 0.9, 1.9 and 2.7 per cent for 100 ft. each; then 3.8 for 50 ft. and 1.6 for 50 ft., ending in a vertical curve over the summit. On the descending side, there is a starting grade of 3 per cent for 50 ft. from the summit to separate the cars before they reach the scales, which are on a grade of 0.75 per cent. This is followed by 1.65 per cent for about 85 ft. and then a grade of 1 per cent to the head of the ladders, which are on grades of 0.55 per cent. The grade of the body tracks beyond the last car-retarder is 0.22 per cent, which is a non-accelerating grade for a speed of 3 to 5 m.p.h.

The hump has two tracks spaced 13 ft. c. to c., each with a 300-ton scale 72 ft. long over the weighing rails. These two tracks are connected by double crossovers on both sides of the summit, but serve two separate ladders in the classification yard, each with its own group of yard or body tracks.

Powerful Hump Locomotives—Owing to the relatively limited capacity of the westbound receiving yard and the impracticability of providing additional tracks, it is necessary to move trains promptly over the hump to the classification yard. For pushing trains up the steep approach to the hump, Mallet engines of the 2-8-8-2 class for heavy loadings are used. These are similar to the road freight engines operating on the division east of the yard, but to enable them to handle full trains on the hump grade their power is increased by auxiliary or booster engines on the tenders.

Instead of the six-wheel trucks of the tenders for road engines, the tender for the yard engine has two four-wheel trucks, each with a two-cylinder engine geared to one axle, while the wheels are connected by coupling rods. The tender carries 12,000 gal. of water and 18 tons of coal, and weighs 130 tons in working order. The locomotive can thus handle readily over the hump a normal train of 100 cars averaging 9,000 tons, while trains of 120 cars or 10,250 tons have been handled.

Car Control in Switching—The westbound classification yard, which is mainly for classifying coal for various destinations, has 37 tracks in all. Of these, 30 are classification tracks proper, six are for bad-order cars and one is for cabooses. To control the movements of cars running by gravity into these tracks, the electro-pneumatic car-retarder system has been installed, by which track brakes gripping the car wheels are operated by compressed-air cylinders with electric control from the switch towers. The pressure is varied to suit the load and speed of each car. In Fig. 3, the plan of hump and entrance to classification yard shows the arrangement of the apparatus.

Two short retarders are placed on the descending hump tracks just above the scales and two longer retarders are placed below the scales. Four are on the

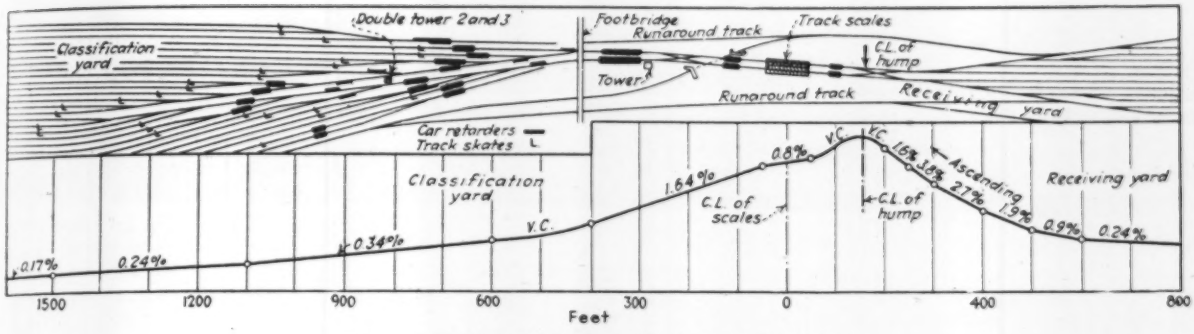


FIG. 3—LAYOUT OF HUMP AND CAR RETARDERS

two main ladders and the others are on the approaches to the individual yard tracks. For each body track there is also a sliding skate, located beyond the last retarder of that track. Should the retarder fail to reduce the speed of the car sufficiently, according to the judgment of the operator, the skate can be thrown upon the rail to check the movement further. On straight track the skate apparatus is 100 ft. beyond the last frog, but where the frog is on a curve the skate is placed on straight track beyond the curve. There are two control towers. The first, 400 ft. from the hump, serves four retarders and nine switches. The second is a double tower, between the main ladders, with an operator on each side to control the movements in the two sections of the yard. This car-retarder system comprises 34 retarders, 44 switches and 37 skates.

The most important improvement in handling cars through this yard, resulting from the installation of the car-retarder system, is the uniformity in weighing and classifying cars immediately upon the arrival of trains and the elimination of the frequent delays that occurred with the old system of operation, due to holding cars at the hump while waiting for car riders to return to the summit. Under this old system, with car riders or brakemen riding the cars to control them as they ran down the hump and into the yard tracks, each shift required about 24 car riders—one operator on a motor car to return these men to the hump, four switch tenders, and two men to uncouple cars at the hump. With power control by the retarders, each shift consists of two hump men, three tower men and a maintainer with helper to take care of the retarder apparatus.

Position-light signals controlled from the top of the hump, where cars are uncoupled, govern the movements of the hump engine and of the trimmer engine in the yard. To permit quick and easy communication between the tower men and the men at the hump there are five loud speakers with microphone attachment. A message spoken into any one mouthpiece is announced clearly from all the loud speakers. Before a train reaches the hump, a switching list has been furnished to the hump men and each tower man, showing the destination for each car. A pneumatic tube system delivers these lists from the yard office to the hump and the towers. Two similar but independent tube systems provide for conveying messages from the hump to the roundhouse, and mine tags (as detached from coal cars) from the receiving yard to the scale house.

Track Construction—The yard is laid with 130-lb. rails of the Pennsylvania Railroad section on the ladders and 100-lb. rails elsewhere, with treated ties in 12 in. of slag ballast for the ladders and gravel for the body tracks. Curves on yard tracks range from 1½ to 5 deg. Turnouts have mainly No. 10 frogs and 16½ switch rails; the sharpest turnouts have No. 7 frogs. For track maintenance, the yard is under a roadmaster and is divided into two sections, each with a foreman and 30 men.

One of the problems was the extension of the tracks of existing yards in service. In reconstructing the east end of the westbound classification, the method was as follows: Track 4 was taken out of service while the frog was placed for the new ladder, after which this track was again put into service. Then track 3 was taken out of service, the new frog placed and connected to the track coming from the frog already placed in track 4. In the same way the other tracks were lengthened in succession up to No. 15, which was the last track in the old yard. As each track was connected it was put into service over the new ladder, while the other tracks were served from the old ladder, except the tracks which were temporarily out of service while being lengthened.

Engine Terminal—With the large number of engines to be cared for at this point, serving three divisions, extensive facilities have been provided for storing, cleaning and running repairs. As a rule the number of engines handled at this terminal average 125 daily. There are two roundhouses—a circular building with 40 stalls and a semicircular building with 21 stalls. Each house has two through tracks. A plan of the engine terminal and shop facilities is given in Fig. 4.

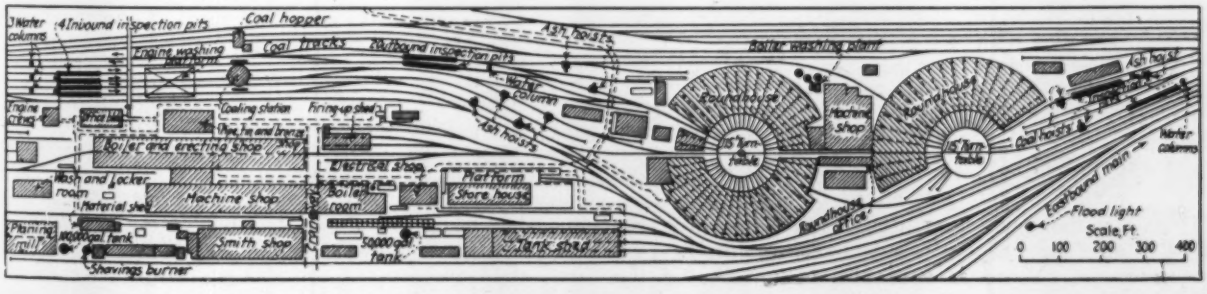


FIG. 4—ENGINE TERMINAL WITH TWO ROUNDHOUSES

The main entrance to this terminal is at its west end, with four inbound tracks spaced 13 ft. c. to c. These tracks pass first over inspection pits 100 ft. long, connected with the inspectors' office by subways. These pits are not covered or housed. Here the enginemen hand to the inspectors their reports of work needed. The inspectors forward these and their own reports to the roundhouse foreman's office by means of a pneumatic tube system, so that arrangements for the necessary work can be made before the engines reach the roundhouse. From the pits the engines go to a concrete washing platform 70x120 ft., on which the engines are washed by an emulsion of hot water and oil sprayed under pressure from a hose, and then by hot water alone. This plan greatly reduces the time and labor cost of cleaning by hand, the engines having only to be wiped down by hostlers after the washing.

The engines pass then to a coaling station having a 2,000-ton bin which serves six tracks. Beyond this, two of the tracks have ashpits and ash-hoists, the ashes from the engine being dropped into a bucket which is raised from the pit on an inclined lateral track. There are two ashpits in each track, so that four engines can clean or drop their fires simultaneously. Water columns are installed in advance of the inspection pits. Both engine tracks unite on a track leading to the turntable, while one of them is connected also to a runaround track.

For outgoing engines, there are two tracks for eastbound engines and two for westbound engines. An unusual feature is that each outbound track has an inspection pit, so that inspectors can be sure that required repairs have been made and that the engines are ready for service. This final inspection is expected practically to eliminate engine failures on the road. Each of these tracks has also an ashpit with mechanical hoist, and each of the two tracks for eastbound engines has the additional feature of a small coaling station, so that if any coal has been consumed while in the roundhouse the supply may be replenished without a backward movement to the main coaling station. Each outbound track has a water column.

Water for locomotives and power-house use is pumped from the Ohio River and first used as condensing water at the power house. It then returns to the upper part of the pump well and is pumped through filters into a 400,000-gal. steel storage tank, about 110 ft. high above the tracks. From this tank the water is fed by gravity through the water-softening plant and stored in three steel tanks, 50 ft. high, having a combined capacity of 500,000 gal. Both treated and untreated water is available.

To facilitate passage of road and yard engines between the westbound receiving and classification yards and the roundhouses, there is a connecting track which passes under the hump through a concrete subway. Between the two roundhouses is a machine shop and a hot-water plant for washing out and filling the locomotive boilers. A shed with two tracks provides for firing up cold engines or those that have been in storage, thus keeping the smoke out of the roundhouse.

Engine Houses—The older of the two roundhouses, which has been enlarged to accommodate longer engines, had steel roof trusses, which have required strengthening on account of the corrosive effects of smoke and gases. Timber framing has been used for this reinforcement and is used generally in new roundhouse for the roof construction. Wood is used also as a rule for the window frames and sash. In the new roundhouse at Portsmouth, however, the long span of the circular overhead traveling crane in the central 67-ft. bay necessitated the use of steel roof framing for this bay in order to provide for the crane runway. The monitor roof above this bay, however, has timber framing. Steel window frames and sash are used in this building, as it is equipped with a smoke exhaust system.

This new roundhouse has a total width of 130 ft. Facing the turntable is a low 44-ft. bay in two spans, housing the tender but having a ventilating slot over each track to carry off smoke and steam as the engines enter and leave the house. The main bay of 67 ft. has

FIG. 5—TRACK-SHIFTING CAR
Machine is ready to straighten bend in track on new fill.

a clear height of 24½ ft. to the radial traveling crane and 31 ft. to the roof trusses. The outer low-roof bay of 19-ft. span is for work and tool benches, while a framing below its roof carries motor-driven fans which serve a flexible pipe system connected to the engine smokestacks, drawing out the smoke and gases and discharging into small chimneys. There are a pipe, a fan and a chimney for each stall. Two 115-ft. turntables serve the roundhouses.

Car Repair Yard and Shops—Four classes of car repair work are provided for by separate groups of tracks: light repairs, ten tracks, 175 cars; heavy repairs, six tracks, 290 cars; loaded car repairs, six tracks, 126 cars; coach repairs, five tracks, 30 cars. There are also eight tracks accommodating bad-order cars awaiting repairs. Car-repair tracks are spaced in pairs, with standard-gage material tracks between alternate pairs of repair tracks.

A group of shops for general engine and car repair work includes an erecting and boiler shop 75x515 ft., machine shop 75x420 ft., and tender shop 65x300 ft., together with blacksmith shop, wood-working shop and minor facilities. Most of these are old buildings, with recent extensions to increase the equipment and capacity. A telephone system connects the shop office with the car inspectors' office at the receiving yard. Concrete driveways provide for movement of material between the shops by trucks and tractors.

Miscellaneous Facilities—To serve refrigerator cars there is an icing station with double-deck platform 400 ft. long, serving ten cars on each side. It may be lengthened to accommodate 30 cars in all. Two reinforced-concrete subways pass under the yard, one at the hump, as mentioned above, and one at the east end to carry an industry track. On both of these the concrete roof slabs are covered with ballast. A small creek is carried across the yard by a culvert consisting of two

lines of 7-ft. concrete pipe. Steam for power and for heating the buildings is supplied from a power house with five boilers of 400 hp. Current for light and power is taken from a 33,000-volt transmission line, which is connected to a substation. For yard work at night there are floodlights with 1,000-watt lamps and 24-in. projectors mounted on 110-ft. steel towers and on the towers for the car-retarder operators.

A new fire-protection system has been installed, with larger mains, a 100,000-g.p.m. turbine-driven pump and a well-distributed equipment of hydrants, hose and hose houses. In the roundhouses there are fire lines and hose at about every third stall. The fire alarm system has a central office in the pump room and alarm boxes in the principal buildings.

Construction Work—The Portsmouth yard occupies a site on the bottom lands along the Ohio River. High bluffs bound it on the north side, while on the south side of the old right-of-way was low ground occupied by a golf course and by a part of the city developed for workmen's residences. To widen the yard, this low land was purchased, cleared and filled by the railway, about 120 frame houses being sold and moved away. All this territory was considerably below high-water level in the river and therefore was not an important suburban section.

About 1,000,000 cu.yd. of filling was required to bring this low ground to grade, and 500,000 cu.yd. for filling the site of the new pull-in tracks farther east. Sufficient material for filling on the south side was available in the bluffs (see Fig. 1). But as a heavily traveled highway and the parallel main lines of the Norfolk & Western Railway and the Baltimore & Ohio Railroad lay along the foot of the bluffs, it was impracticable to handle work trains on surface tracks. A single-track timber trestle about ½ mile long, crossing the road and tracks diagonally and having grades of 2 and 3 per cent, was therefore built.

The fill, 15 to 30 ft. deep, was deposited by trains of standard-gage dump cars of 12 to 30 cu.yd. capacity. All of the material was shale and earth; in the solid shale blast holes were put down by well drills. The length of haul averaged 1½ miles, and four dumping tracks were kept in service, the material being side dumped and then leveled by a spreader car. For the continual moving of the track toward the edge of the dump a power-operated track-shifting machine (Fig. 5) was used, making three trips for each lateral shift of 12 ft. At first this shifting was done by gangs of 25 to 35 men, but the machine with two or three men did the work more quickly and at much less cost.

Engineers and Contractors—The plans for reconstruction of this yard were made under the direction of W. P. Wiltsee, chief engineer, Norfolk & Western Railway, and all construction work has been carried out under his supervision, with the assistance of F. P. Turner, principal assistant engineer. The field work was in direct charge of C. E. Armstrong, assistant engineer at Portsmouth, Ohio, assisted by C. W. Whitt and Harry E. Smith, resident engineers. All the new shop buildings, together with the mechanical smoke-exhaust system for the new roundhouse, were designed by L. L. Kelly, bridge engineer. Tracklaying and ballasting and the complicated work of extending and rearranging tracks were done by railway company forces under the supervision of D. F. Peters, superintendent, and W. L. Anglin, assistant superintendent, at Portsmouth.

Grading and filling were done by W. W. Boxley & Company, Roanoke, Iowa, and Sturm & Dillard, Portsmouth, Ohio. Building construction and enlargement were handled by J. P. Pettyjohn & Company, Lynchburg, Va.; H. A. Lucas, Bluefield, W. Va., and McCabe & Proctor, Portsmouth, Ohio. The car-retarder system was installed by the Union Switch & Signal Company, Swissvale, Pa. The boiler-washing plant and the spray-washing system for cleaning locomotives were designed and installed by the motive power department, under the direction of R. G. Henly, superintendent of motive power, Norfolk & Western Railway.

Neglect of Precautions Caused Cleveland Clinic Disaster

Fire Underwriters' Regulations Violated in Many Particulars—Reports Made by Investigators

RESULTS of a number of investigations of the Cleveland Clinic disaster of May 15, 1929, which resulted in the death of 126 (reported in *Engineering News-Record*, May 23, 1929, p. 845), indicate that the conditions under which X-ray films were stored in the building violated many of the regulations of the National Board of Fire Underwriters. It has been fairly well established that an electric light bulb in direct contact with some of the films was the immediate cause, but the resulting damage would have been negligible, the investigators conclude, had proper precautions been taken in storing the films.

Of the many investigations started after the disaster, the two more important were conducted by Dr. R. E. MacLaurin, commissioner of trade wastes for the city of Cleveland, and the Chemical Warfare Service of the U. S. Army. Reports of both of these are now available.

Description of the Building

The clinic, as shown in the accompanying diagram, is a four-story concrete and tile structure 122x74 ft. in plan, with an internal court 30x40 ft. extending from the first floor to the attic. Films were stored in a 20x25-ft. brick room in the basement which had formerly been a coal room. This was equipped with an automatic fire door which could not function at the time of the accident because of an interfering pipe. There was no vent to the outer air, nor was a sprinkler system provided.

Light was provided by a number of electric bulbs hung on flexible cord. Approximately 7,000 lb. of X-ray films was stored in this chamber, most of them in manila envelopes on wooden shelves. The room was traversed by a 4-in. pipe carrying steam at 65 lb. per sq.in., a temperature of approximately 311 deg. F. This pipe passed less than a foot from some of the films. Connected with the storage room was a pipe tunnel 4x6 ft. in section which surrounded the unexcavated portion of the basement just inside the outer wall of the building. From this tunnel there were several hollow tile ducts extending upward through the wall to the closed attic above the fourth floor ceiling, with intermediate openings at the several floors. The pipe tunnel and ducts, and also a stair well adjacent to the storage room, provided channels for the diffusion of gas throughout the entire building.

Events at the time of the accident are summarized

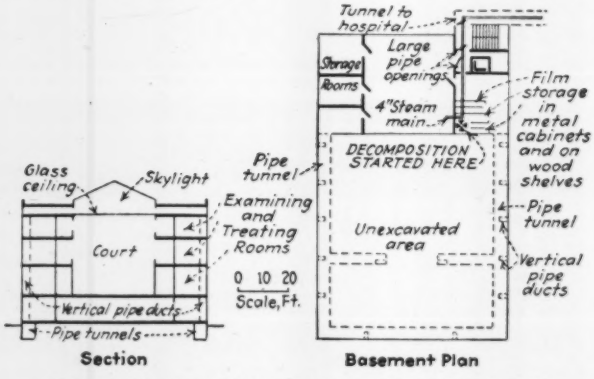
in the following, taken from the *Factory Mutual Record* of the Associated Factory Mutual Fire Insurance Companies of Boston:

At about 9 a.m. on Wednesday, May 15, a steam fitter was called to repair a leak in the steam pipe in the coal room, just above the film shelves. He removed the covering from the pipe and, finding it too hot to work on, went over to the hospital to have the steam shut off. Returning about 11:15, he entered the room and saw a small cloud of brownish gas, which he mistook for smoke, at the ceiling above the film storage. He obtained a soda-acid extinguisher and directed it at what he supposed was a fire, but the gases rapidly increased in intensity and drove him from the room, the door of which he left open. He escaped from the basement through a window.

A few minutes after the first discovery of trouble an explosion occurred in the basement. This may have resulted from the formation of an explosive mixture of the gases with air or, more likely, a gigantic puff as the gases burst into flames spontaneously from the increasing heat of decomposition. Just outside the film-room door was an automatic gas water heater, the pilot light of which was undoubtedly lighted and might have ignited the gases.

A second explosion soon followed in the basement. Then ten minutes later a violent explosion in the hollow space beneath the roof blew down the ceiling of many of the top-story rooms and lifted the roof skylight. An explosive mixture of the gases and air in the roof space was probably ignited by fire which flashed up one of the ducts.

It was brought out in the investigation that when the steam fitter left the clinic to have the steam shut off a 100-watt bulb was left burning in the storage room, suspended from a cord supported by the steam pipe. The bulb and its socket were found after the accident



ARRANGEMENT DIAGRAM OF CLEVELAND CLINIC

with the switch in the "on" position. Reconstruction of the scene leads to the belief that the bulb was in actual contact with some of the films on an adjacent shelf, and that its probable temperature was in the neighborhood of 440 deg. F. These facts were brought out in the investigation conducted by the city of Cleveland. Experiments disclosed that a bulb of this power would ignite similar X-ray films in from two to seventeen minutes, whereas the same bulb with a standard wire guard, maintaining a ½-in. clearance, failed to ignite films during a five-hour test. In a second series of experiments steam at 315 lb. pressure and 150 deg. superheat (565 deg. F.) when discharged into a box containing nitrocellulose films caused discoloration of the films, but no decomposition at the end of ten minutes. In view of this evidence it was concluded that the electric light bulb, and not escaping steam, was the immediate cause of the tragedy.

The army inquiry into the disaster included a series of exhaustive experinemts at Edgewood Arsenal, Md., investigation of all literature bearing on the subject of nitrocellulose films and expert advice from a number of witnesses, including Major-Gen. Harry L. Gilchrist, chief of the Chemical Warfare Service, who visited the clinic soon after the disaster. Dr. A. J. Pearse, coroner at Cleveland, also gave his assistance. By large-scale experiments which practically duplicated conditions at Cleveland it was shown that nitrocellulose films can be ignited by coming into contact with a hot steam pipe, an electric light bulb or any source of heat which raises the temperature of the film to about the boiling point of water for a considerable length of time, or to higher temperatures for correspondingly shorter periods. To determine the efficacy of various safeguards a special vault was constructed. It was determined that reasonably safe storage for about 1½ tons of X-ray film could be provided by a storage vault 7x8x8 ft., equipped with a 16-in. square vent placed in the rear wall just below the roof, held closed by a 155 deg. F. fusible link and also protected by two automatic sprinklers and a fire door. Tests with commercial fire extinguishers indicated that none of these was satisfactory for extinguishing film fire. Water was effective when applied in large quantities. It was also determined that gas masks which filter the contaminated air do not give adequate protection for rescue work, but that oxygen helmets must be used.

Both reports agree that little danger attends the combustion of films in the presence of a plentiful supply of oxygen, but that when burned or decomposed in a closed chamber large amounts of various lethal gases are given off. The exact composition of these depends on conditions of combustion but, in general, they contain carbon monoxide, oxides of nitrogen and hydrocyanic acid gas. These not only are dangerous to human life but are also combustible and, when mixed with air, explosive. Carbon monoxide, when sufficiently concentrated, causes almost instant death; nitrous fumes may cause either immediate or delayed death.

Underwriters' Regulations Disregarded

Regulations of the National Board of Fire Underwriters for the storage and handling of photographic and X-ray nitrocellulose films, published by the National Fire Protection Association in 1925 and generally accepted as conservative practice, include the following recommendations: (1) Automatic sprinklers should be provided. (2) Heating should be by hot water or low-pressure steam and no steam pipe should pass within 2 ft. of stored films. (3) Lighting should be by guarded bulbs in vapor-proof globes, and no extension cord should be permitted. (4) Storage chambers should be isolated from the remainder of the building and should preferably be placed on the roof. (5) Vents to the outer air should be provided. Not one of these precautions was taken at Cleveland.

It is brought out by the *Mutual Factory Record* that during the fall of 1928 an X-ray film fire strikingly similar to the Cleveland disaster occurred in a Detroit hospital. Films were stored in paper envelopes on shelves in a basement vault. Escaping steam heated the vault wall sufficiently to start decomposition, but, as the vault was vented to the outer air, most of the gases escaped harmlessly. A sprinkler system was in operation which extinguished the fire with only about 15 per cent of the films charred.

The investigation by the city of Cleveland emphasized the fact that a similar hazard to the storage of films exists where other nitrocellulose products are used, including celluloid, nitroglycerine and nitrocellulose lacquers.

From Job and Office

Hints That Cut Cost and Time for the Contractor and Engineer

Unique Cantilever Concrete Roof Used on New Argentine Railway Station

By Otto Gottschalk

Consulting Engineer, Buenos Aires, Argentina

THE NEW Rosario (Argentine Republic) passenger terminal of the Santa Fe Railway consists chiefly of a long one-aisle one-story building, alongside of which runs the main platform 27 ft. wide and 650 ft. long. A reinforced-concrete roof was specified for the platform,

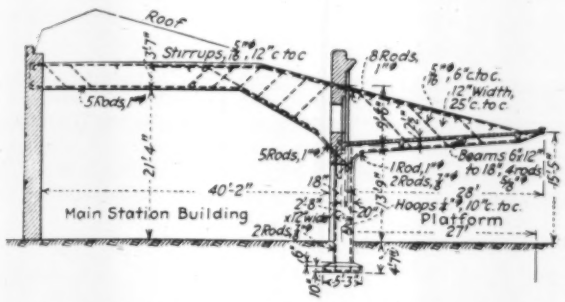


FIG. 1—DETAILS OF CONCRETE CANTILEVER ROOF BEAM ROSARIO RAILROAD TERMINAL, ARGENTINA

and since no columns were to be admitted, the roof had to be supported on cantilevers 28 ft. long.

This was not easy, because the main building contained no structure to which these large cantilevers might safely be joined and the construction of a self-resisting structure, formed by heavy wall columns which would transmit the cantilever moment to wide bases beneath the platform, would have been exceedingly expensive and in addition was not deemed advisable because of possible movements produced by train impact. It was finally decided to continue the 28-ft. cantilever beams back 42 ft. to the opposite exterior wall of the main building which could be used as an anchor beam with a weight sufficient to neutralize the cantilever moment, although it served at the same time to support the building roof. Details of the cantilever and anchor beams are shown in Fig. 1, while Fig. 2 shows a photograph of the beams after construction. Beams had to be spaced 25 ft. center to center in order to conceal the inclined parts within the crosswalls.

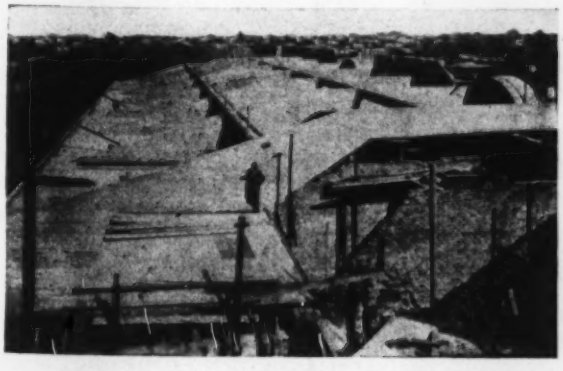


FIG. 2—CONCRETE CANTILEVER ROOF BEAMS DURING CONSTRUCTION

The reinforced-concrete structures of the terminal were designed by the writer and constructed by the Luis Falcone Company, of Buenos Aires.

High-Speed Maintainer for Earth and Gravel Road

By R. W. Bennett

Office Engineer, New Mexico Highway Department, Santa Fe, N. M.

MOST of the 5,300 miles of roads maintained by the New Mexico Highway Department is of gravel or earth construction. With exceedingly limited resources for such a mileage, the maintenance engineer's constant endeavor is toward more rapid coverage without loss of efficiency. In 1927, therefore, the department in collaboration with H. R. Andrew, inventor and manufacturer, of Roswell, N. M., undertook some experimental work with road maintainers.

About 4 m.p.h. had been the maximum speed obtainable with the ordinary road drag or maintainer. A speed in excess of 4 miles caused the machine to vibrate or chatter to such an extent that a poorly maintained road surface was the result. The objective of the experiments

HIGH-SPEED MAINTAINER, NEW MEXICO HIGHWAY DEPARTMENT

was, therefore, a lighter piece of equipment so designed as to "hold the road" with the increased speed desired.

The first machine built was in principle similar to commercial machines, the main difference being the more acute angle to which the forward blades were set, this angle being 30 deg. instead of the usual 45 deg. The blades were set in the shape of a letter V, vertex forward. The weight of the drag was 2,500 lb. with extension blades.

The machine was thoroughly tested during 1927 and 1928 and is, in fact, still in service. The results were good. A speed of 6 to 8 m.p.h. was attained with no more vibration or chatter than an ordinary maintainer developed at 4 m.p.h. Not content with this accomplishment, efforts were bent toward more speed and less vibration in a still lighter machine.

The second maintainer, illustrated, weighs 2,100 lb., as against 2,500 lb. for the older machine, including extension blades. The width of blades from out to out

is 11½ ft.—that is, 21 to 23 ft. of roadway can be covered on a round trip. It can be pulled readily with a 1½ to 2-ton truck. On test runs so far conducted efficient maintenance is obtained with a speed of 10 to 12 m.p.h.—in some cases 15 m.p.h.

The interesting feature of the new machine is the device for overcoming vibration. This consists of three stabilizer blades, two located at the front, one on either side and one at the rear center, all set vertical and parallel to the center line of the roadway. These blades are controlled from the operator's platform at the rear by means of foot levers. When the machine strikes a road surface which causes it to vibrate, the operator applies the necessary pressure or elevation to these blades, and side sway and chatter cease.

From tests made it is believed that, with a 2-ton truck for power, this new machine can successfully maintain New Mexico roads at an average speed of 10 to 12 m.p.h. With two units operating in tandem, 80 to 120 miles of road can be covered completely in one day. Savings will be effected not only in the increased maintained distance but in lower purchase and operation costs by reason of lesser power requirements.

Old Wood Trusses Supported by New Suspension Spans

WITHOUT removing or altering the existing arched timber trusses, the engineering department of the city of Los Angeles recently preserved several 40- to 50-ft. footbridges by suspending the old spans from new trusses. These footbridges span the numerous canals forming a part of the recreation scheme in the former city of Venice, Calif. The original structures were built with the ends of the timber trusses embedded directly in concrete piers.

Reconstruction was decided upon when it was found

BRIDGE RECONSTRUCTED BY HANGING OLD TRUSSES FROM SUSPENSION SPAN

that the wood at the junction with the concrete had rotted to the danger point. The method of repair consisted of retaining the original bridges intact, suspending them from additional trusses as shown in the accompanying illustration. The work consisted of topping the piers with timber posts from which round steel rods, acting as the cables of a suspension bridge, were used to carry the old spans by means of eyebolt hangers. The new compression members between the raised piers consist of laminated timber chords with timber struts down to the top chords of the old bridge. When the suspension rods were tightened, the new truss, which had been designed to support the entire structure and live load, relieved the weak point of the old truss and at the same time incorporated the timber latticing of the old bridge into the new design. The repair work eliminated the arched effect of the old bridge, but no protests have resulted from the required change in architecture.

The bridge reconstruction was done by the engineering department of the city of Los Angeles; John C. Shaw, city engineer; R. W. Stewart, chief deputy.

From Job and Office

Hints That Cut Cost and Time

Elimination of Red-Water Trouble at Asbury Park, N. J.

By Stuart K. Knox
Associated With Nicholas S. Hill, Jr., New York City

AFTER experiencing difficulties with its water supply for a number of years Asbury Park, N. J., decided, less than two months before the opening of the 1928 summer season, to adopt remedial measures. Little time was available for experimentation and still less for new construction. Investigations were made and plans, specifications and contracts drawn in less than three weeks after their authorization. Then, as sometimes happens, after contracts had been let the construction was postponed until fall, and arrangements were made for purchasing water from another source while a part of it was being carried out.

The existing plant consisted of five deep wells, pumped by compressed air, discharging into a 0.2-m.g. settling basin. From this basin the water was pumped through pressure filters into the distribution system. The water from the wells is soft, and high in free carbon dioxide (27.5 p.p.m.), as well as in iron (8.5 p.p.m.). Iron passing the plant, together with the corrosive action of the water, resulted in red water.

The compressed air equipment was oversize and wells were operated intermittently at high rates. Pumping to the distribution system was continuous, and wide fluctuations in the water level in the settling basin resulted. The settling basin had no facilities for cleaning and a large accumulation of iron sludge was present. Considerable oxidation and precipitation of iron occurred but, owing to the presence of the sludge, the low elevation of the outlet pipe and the short circuiting and agitation in the basin an excessive amount of iron passed into and through the filters. The pressure filters, with a nominal capacity of 1.6 m.g.d., were operated at times of heavy draft at twice this rate. To facilitate overloading, a very coarse sand (effective size, 0.92 mm. to 1.03 mm.) had been placed in the filters. Filters were washed with unfiltered water taken from the discharge of the main pumping units. This could be done only at night.

To correct the defects, the various well-discharged pipes were led to an aerator, built over one corner of the settling basin, consisting of a series of steel pans with alternate perforated and plain sections. The aerator oxidizes the iron and reduces the free carbon dioxide. Timber inlet and outlet flumes were constructed in the basin to eliminate short circuiting, reduce the possible

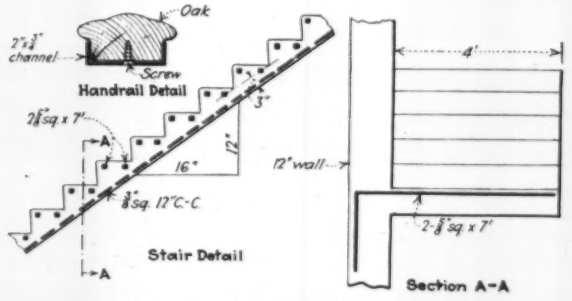
From Job and Office

For Contractor and Engineer

fluctuation in water levels and provide an outlet at proper elevation. The maximum detention period in the basin was thus utilized. Two additional 0.5-m.g.d. filter units, unhoused, were added and the sand in the old units was replaced with a sand having an effective size of 0.49 mm. A 25,000-gal. wash water tank was erected so that all filters could be washed with filtered water. These additions eliminated the overloading and provided effective filtration. The cost of the improvements was about $17,000.

Cantilever Slab of Reinforced Concrete Simplifies Stairway Design

A CONCRETE stairway in the recently completed Beverly Hills (Calif.) water-treatment plant was built as a cantilever slab, eliminating the usual longitudinal supporting beams. This simpified type of construction

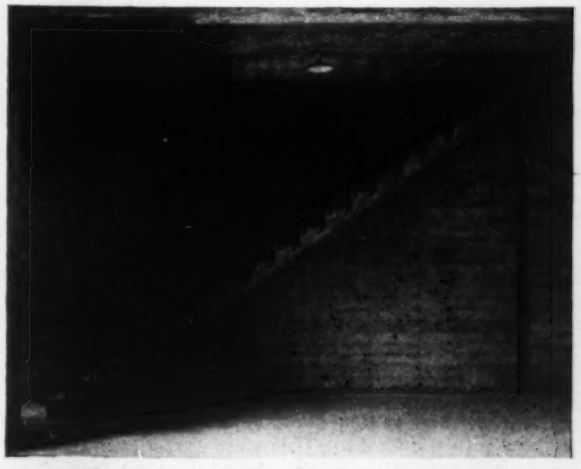


DETAIL OF CANTILEVER STAIRWAY REINFORCING

was used for a staircase about 22 ft. long and 4 ft. wide, joined at one side to a 12-in. concrete wall. The minimum slab thickness is 3 in., with steps of 10⅜-in. treads and 9-in. risers. The concrete is of a 1 : 2½ : 3½ mix, and the details of the reinforcing are shown in the accompanying drawings.

A simple and effective railing was built by using ¾-in. twisted reinforcing bars, topped by a small channel in which an oak railing was secured by screws put through the channel from below.

The plant was designed by Salisbury, Bradshaw & Taylor, of Los Angeles.



STAIRWAY OF CANTILEVER SLAB
Note lack of supporting beams and railing of twisted reinforcing bars.

Slag Backfilling Gives Good Results at Saving in Cost

By W. C. Hawley
Chief Engineer and General Superintendent, Pennsylvania Water Company, Wilkinsburg, Pa.

PROPER replacement of modern pavements which have been opened for trenching depends largely upon backfilling the excavated material so that it will not settle. Few soils can be replaced properly by tamping, and while many can be replaced by backfilling in water, in some cases the backfilled material will not dry so that the pavement can be replaced within a reasonable period.

This difficulty has been overcome to a large extent within the last two years in the district surrounding Pittsburgh, Pa., by the use of pulverized slag for backfilling. After the pipe has been laid a small amount of earth is thoroughly tamped around and above it, and then the excavation is refilled with pulverized slag in 2- to 4-in. layers, wetted and thoroughly rammed. It is seldom necessary to do anything further. In a day or two the concrete or other paving may be put on the slag, which sets up like concrete, although not so hard that it cannot be excavated with pick and shovel if necessary. The excavated material is hauled away and disposed of, the expense of this being more than offset by the fact that it is not necessary to go back two or three times to relay the pavement after it has settled.

Pulverized slag is particularly useful for backfilling trenches made to repair leaks, where the excavated material is wet and not fit for backfilling. Its suitability may be judged by the fact that it has been used satisfactorily as a foundation for pavement instead of concrete. The use of slag is, of course, limited by its cost. In the Pittsburgh district it can be had in carload lots for the freight. It should be obtainable in many other localities where there are steel mills. Several municipalities near Pittsburgh now require backfilling with slag by ordinance, and others are considering this action. Investigation has shown that the sulphur present in the slag is in insufficient quantities to cause damage to pipes.

Earthwork Tables Give Volumes Required for Fills From End Areas

By D. W. Webster
Monroe, Mich.

THE accompanying earthwork table is useful in balancing cuts and fills, as it gives the volumes required for fills directly from end areas with 20 per cent added to take care of shrinkage in accordance with usual practice. The yardages obtained are the volumes of prisms 100 ft. long.

To use the table, find the sum of the end areas in the body of Table A. The reading at the top or bottom of Table A gives the corresponding volume. When the sum of the end areas contains a fractional square foot,

EARTHWORK TABLE GIVING VOLUMES OF FILLS PLUS 20 PER CENT DIRECTLY FROM SUM OF END AREAS—100-FT. PRISMS

Table A											Table B									
1000	900	800	700	600	500	400	300	200	100	0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
450	405	360	315	270	225	180	135	90	45	0	0.0	0.2	0.4	0.6	0.9	1.1	1.3	1.6	1.8	2.0
451	406	361	316	271	226	181	136	91	46	1	2.2	2.4	2.7	2.9	3.1	3.3	3.6	3.8	4.0	4.2
452	407	362	317	272	227	182	137	92	47	2	4.4	4.7	4.9	5.1	5.3	5.6	5.8	6.0	6.2	6.4
453	408	363	318	273	228	183	138	93	48	3	6.7	6.9	7.1	7.3	7.6	7.8	8.0	8.2	8.5	8.7
454	409	364	319	274	229	184	139	94	49	4	8.9	9.1	9.3	9.6	9.8	10.0	10.2	10.4	10.7	10.9
455	410	365	320	275	230	185	140	95	50	5	11.1	11.3	11.6	11.8	12.0	12.2	12.4	12.7	12.9	13.1
456	411	366	321	276	231	186	141	96	51	6	13.3	13.6	13.8	14.0	14.2	14.5	14.7	14.9	15.1	15.4
457	412	367	322	277	232	187	142	97	52	7	15.6	15.8	16.0	16.3	16.5	16.7	16.9	17.2	17.4	17.6
458	413	368	323	278	233	188	143	98	53	8	17.8	18.0	18.3	18.5	18.7	18.9	19.2	19.4	19.6	19.8
459	414	369	324	279	234	189	144	99	54	9	20.0	20.2	20.4	20.7	20.9	21.1	21.3	21.6	21.8	22.0
460	415	370	325	280	235	190	145	100	55	10	22.2	22.4	22.7	22.9	23.1	23.3	23.6	23.8	24.0	24.2
461	416	371	326	281	236	191	146	101	56	11	24.4	24.7	24.9	25.1	25.3	25.6	25.8	26.0	26.3	26.5
462	417	372	327	282	237	192	147	102	57	12	26.7	26.9	27.1	27.4	27.6	27.8	28.0	28.2	28.5	28.7
463	418	373	328	283	238	193	148	103	58	13	28.9	29.1	29.3	29.6	29.8	30.0	30.2	30.4	30.7	30.9
464	419	374	329	284	239	194	149	104	59	14	31.1	31.3	31.5	31.8	32.0	32.2	32.4	32.6	32.9	33.1
465	420	375	330	285	240	195	150	105	60	15	33.3	33.5	33.8	34.0	34.2	34.4	34.6	34.9	35.1	35.3
466	421	376	331	286	241	196	151	106	61	16	35.5	35.7	36.0	36.2	36.4	36.6	36.8	37.1	37.3	37.5
467	422	377	332	287	242	197	152	107	62	17	37.8	38.0	38.2	38.4	38.6	38.8	39.1	39.3	39.5	39.7
468	423	378	333	288	243	198	153	108	63	18	40.0	40.2	40.4	40.7	40.9	41.1	41.3	41.6	41.8	42.0
469	424	379	334	289	244	199	154	109	64	19	42.2	42.4	42.6	42.9	43.1	43.3	43.5	43.7	44.0	44.2
470	425	380	335	290	245	200	155	110	65	20	44.4	44.6	44.9	45.1	45.3	45.5	45.8	46.0	46.2	46.5
471	426	381	336	291	246	201	156	111	66	21	46.7	46.9	47.1	47.3	47.6	47.8	48.0	48.2	48.5	48.7
472	427	382	337	292	247	202	157	112	67	22	48.9	49.1	49.3	49.6	49.8	50.0	50.2	50.4	50.7	50.9
473	428	383	338	293	248	203	158	113	68	23	51.1	51.3	51.6	51.8	52.0	52.2	52.4	52.7	52.9	53.1
474	429	384	339	294	249	204	159	114	69	24	53.3	53.6	53.8	54.0	54.2	54.5	54.7	54.9	55.1	55.3
475	430	385	340	295	250	205	160	115	70	25	55.6	55.8	56.0	56.2	56.5	56.7	56.9	57.1	57.3	57.6
476	431	386	341	296	251	206	161	116	71	26	57.8	58.0	58.2	58.5	58.7	58.9	59.1	59.4	59.6	59.8
477	432	387	342	297	252	207	162	117	72	27	60.0	60.2	60.5	60.7	60.9	61.1	61.3	61.6	61.8	62.0
478	433	388	343	298	253	208	163	118	73	28	62.2	62.4	62.7	62.9	63.1	63.4	63.6	63.8	64.0	64.2
479	434	389	344	299	254	209	164	119	74	29	64.4	64.7	64.9	65.1	65.3	65.6	65.8	66.0	66.2	66.4
480	435	390	345	300	255	210	165	120	75	30	66.7	66.9	67.1	67.3	67.6	67.8	68.0	68.2	68.4	68.7
481	436	391	346	301	256	211	166	121	76	31	68.9	69.1	69.3	69.6	69.8	70.0	70.2	70.4	70.7	70.9
482	437	392	347	302	257	212	167	122	77	32	71.1	71.3	71.6	71.8	72.0	72.2	72.4	72.7	72.9	73.1
483	438	393	348	303	258	213	168	123	78	33	73.3	73.6	73.8	74.0	74.2	74.5	74.7	74.9	75.1	75.4
484	439	394	349	304	259	214	169	124	79	34	75.6	75.8	76.0	76.2	76.5	76.7	76.9	77.1	77.3	77.6
485	440	395	350	305	260	215	170	125	80	35	77.8	78.0	78.2	78.5	78.7	78.9	79.1	79.3	79.6	79.8
486	441	396	351	306	261	216	171	126	81	36	80.0	80.2	80.5	80.7	80.9	81.1	81.4	81.6	81.8	82.0
487	442	397	352	307	262	217	172	127	82	37	82.2	82.5	82.7	82.9	83.1	83.4	83.6	83.8	84.0	84.2
488	443	398	353	308	263	218	173	128	83	38	84.5	84.7	84.9	85.1	85.4	85.6	85.8	86.0	86.2	86.5
489	444	399	354	309	264	219	174	129	84	39	86.7	86.9	87.1	87.4	87.6	87.8	88.0	88.2	88.4	88.7
490	445	400	355	310	265	220	175	130	85	40	88.9	89.1	89.3	89.6	89.8	90.0	90.2	90.5	90.7	90.9
491	446	401	356	311	266	221	176	131	86	41	91.1	91.3	91.6	91.8	92.0	92.2	92.5	92.7	92.9	93.1
492	447	402	357	312	267	222	177	132	87	42	93.3	93.6	93.8	94.0	94.2	94.3	94.7	94.9	95.1	95.3
493	448	403	358	313	268	223	178	133	88	43	95.6	95.8	96.0	96.2	96.4	96.7	96.9	97.1	97.3	97.5
494	449	404	359	314	269	224	179	134	89	44	97.8	98.0	98.2	98.4	98.7	98.9	99.1	99.3	99.6	99.8

500 sq.ft. = 1,111.1 cu.yd.
1,000 sq.ft. = 2,222.2 cu.yd.
1,500 sq.ft. = 3,333.3 cu.yd.
2,000 sq.ft. = 4,444.4 cu.yd.
2,500 sq.ft. = 5,555.5 cu.yd.
3,000 sq.ft. = 6,666.6 cu.yd.
3,500 sq.ft. = 7,777.7 cu.yd.
4,000 sq.ft. = 8,888.8 cu.yd.
4,500 sq.ft. = 9,999.9 cu.yd.

find the volume to be added to the results obtained from Table A by starting with the fraction at the top of Table B, following down vertically until intercepting the horizontal line of figures containing the whole figure area used in Table A. The reading at this point is the yardage to be added to the results obtained from Table A to get the total yardage of the 100-ft. prism.

Example: Consider the sum of the end areas of the prism to be 342.3 sq.ft. Looking up the whole number 342 in the body of Table A, it is found to fall in the vertical column headed 700 cu.yd. Then starting in the column in Table B headed 0.3 and following down until reaching the horizontal line of figures containing the whole number 342 in Table A, the reading 60.7 is obtained. This figure added to the reading 700 obtained from Table A gives a total yardage of 760.7 cu.yd., the volume plus 20 per cent of a prism 100 ft. long having the sum of its end areas total 342.3 sq.ft.

Chlorine Control for a Small Direct-Pressure Water System

By Earnest Boyce
Chief Engineer, Kansas State Board of Health, Lawrence, Kan.

RECENTLY it became necessary to chlorinate a small water supply in Kansas obtained from an infiltration gallery. The supply was available in an amount sufficient to meet the maximum instantaneous demand and was being pumped by a direct-connected motor-driven centrifugal pump directly into the mains. The maximum pumping rate did not exceed 150 g.p.m., with a minimum rate at night approximately equal to the leakage in the distribution system. It was not considered practicable to install equipment that would supply chlorine in proportion to the pumpage, due to control difficulties at times of minimum pumpage and cost of installation. It was very important that the proper amount of chlorine be applied—an insufficient amount failing to give needed sterilization and an overdosage tending to discredit and discourage its continued use.

The installation of a storage reservoir with a controlled uniform inflow from the infiltration gallery, with chlorination at the inlet to the reservoir, was first recommended, but was found to be too expensive.

The plan finally adopted was to construct a small concrete well, which serves as both a mixing tank for the chlorine applied and as a suction well for the centrifugal pump. Water is carried to this suction well from the infiltration gallery at a constant rate controlled by a fixed orifice with a constant but manually controllable head. The water enters the suction well at a rate slightly in excess of the maximum pumping rate. An overflow weir is provided to waste the difference between the fixed inflow quantity and the amount being pumped into the mains. This weir is so designed that it can be used to calibrate the inflow rate by temporarily closing the pump suction and causing all the water to discharge through the weir. Should the centrifugal

pump at any time pump at a rate greater than the amount entering the suction well, the drop in water level could be used to operate a float-controlled alarm for the operator. This arrangement permitted the installation of a relatively less expensive type of chlorine-control equipment and assured a uniform dosage of the water pumped into the mains.

With a pumping rate of 0.25 m.g.d., or approximately 175 g.p.m., and a dosage of 1 p.p.m. of chlorine, both of which may be assumed as maximum, the total daily consumption of chlorine would be approximately 2.1 lb. Since the chlorine wasted by this installation is only that part represented by the volume of water bypassed, it is obvious that the cost of chlorine wasted is insignificant and that the installation is economical.

Letters to the Editor

Fort Steuben Suspension Bridge Inspected

Sir—On May 6 the writer visited the site of the Fort Steuben bridge and inspected the cables, anchorages, stiffening trusses, towers and supporting piers to determine the condition of the structure as the result of its use subject to traffic and weather conditions since it was opened on Aug. 29, 1928. It is because the inspection of the parts of the structure just enumerated was so simple and easy to make that the writer feels that comment is worth while.

The Fort Steuben bridge crosses the Ohio River between Steubenville, Ohio, and Weirton, W. Va. The center span is 688.75 ft. long and the side spans are each 283 ft. long. There is also on the West Virginia side about 330 ft. of viaduct approach. A description of the bridge by George F. Wolfe, assistant chief engineer of the Dravo Contracting Company, appeared in *Engineering News-Record*, Aug. 30, 1928, p. 304.

The attachment of the wire cables of this bridge to the anchor chains is by means of strand shoes in what may be called the standard manner. The connection between the strand shoes and the anchor chains, however, is on the river side of the cable bents and is completely housed in by a carefully fitted cover, which is easily removed, thereby allowing complete inspection throughout the extent of the loop of each strand of the cable around its individual strand shoe. The space between the wires of the strands had been filled as far as possible with red lead before the cable was wrapped,

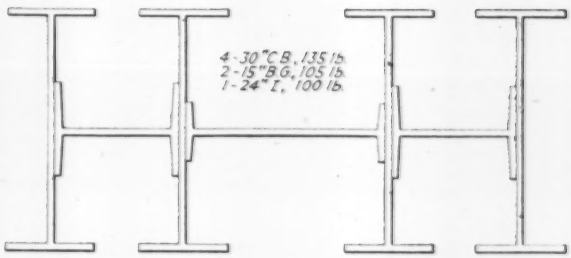


FIG. 2—CROSS-SECTION OF TOWER LEGS

and in addition for the portion of the cables from the cable band to the strand shoes all of the exposed wires had been thoroughly painted.

The seizing had been removed from the strands so the strands could be opened up for inspection. The individual wires were carefully examined through a magnifying glass to see if there was any indication of overstraining, which overstraining might be evidenced by the condition of the paint on the wires. The fact that with the cover removed there was plenty of light and that the cable strands could be seen from the top as well as from the bottom impressed the writer as a very valuable feature, contributing toward the ease of periodic inspection and maintenance of this very important detail of the bridge. Further, the location of this detail above ground, where there is little dampness due to either condensation or free water, is good.

Fig. 1 shows the housing of the connection of the cable to the anchor chain.

The eyebar chains connecting the cables to the anchor girders embedded in the masonry had been concreted and grouted in after the bridge had been fully erected and received its full dead load. The stretch in these anchor eyebars due to subsequent live load and temperature has not produced any cracking or breaking of the concrete surrounding the bars and there is no sign of rusting of the bars where they enter the masonry. Care had been taken in detailing to avoid the occurrence of pockets which would hold water at the points where the bars enter the masonry.

The alignment of the stiffening trusses as a whole as well as that of the individual members was observed and the points of attachment of the suspenders to the stiffening trusses were inspected. The rivets connecting the lug-angle suspender supports to the panel points of the trusses were accessible both inside and outside the connection; no loose rivets were found. In designing the stiffening trusses care had been taken to eliminate lattice bars and battens as much as possible, H-sections being used throughout for the web members. These features of the stiffening truss design gave

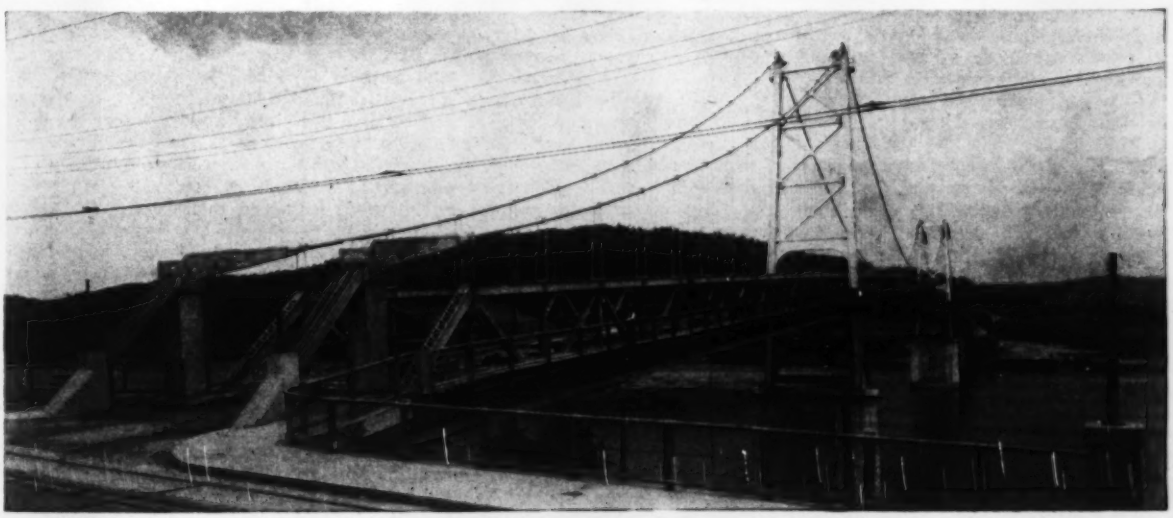


FIG. 1—THE FORT STEUBEN BRIDGE

great simplicity to the details and accessibility to all of the riveting for inspection and maintenance.

The towers had been designed with the idea of having the component parts accessible, free from the use of latticing and with as few batten plates as possible. The make-up of the section is shown by the sketch (Fig. 2). Field inspection of these tower posts was very easy. The parallelism of the edges and their absolute straightness could be determined by sighting along them. Every rivet tying the material together could be readily seen at both ends. The concrete piers supporting the towers showed no evidence of deterioration from the mechanical action of water or ice for the portion of the height of the pier exposed, and the portion of the concrete masonry below the heavy tower posts was absolutely true to shape and free from any sign of overstress.

The Fort Steuben bridge was designed, constructed and erected by the Dravo Contracting Company. The writer was consulting engineer for the owner, the Steubenville Weirton Bridge Company.

New York City, May 11, 1929. CLARENCE W. HUDSON, Consulting Engineer.

The Tri-State Delaware River Compact

Sir—The writer, who was a member of a committee which about a year ago made some study of the proposed Delaware River compact between the states of New Jersey, New York and Pennsylvania, believes that had the provisions of the compact been fully known to the citizens of eastern Pennsylvania, strong opposition would have developed.

The first compact was dated June 4, 1925, but was ratified by New York only. The second compact, under present consideration, was signed on Jan. 13, 1927, and also failed of ratification except by New York.

In making an analysis of the second compact, it is well to consider impartially how its terms will affect the future development and growth of all towns and cities situated in eastern Pennsylvania, whether some substantial material resources are not sacrificed, and whether sufficient vision is indicated to safeguard the future of the state for generations to come. According to Art. IV of the compact, all waters of the Delaware River watershed above Trenton would become subject to the jurisdiction of a commission. There are several important streams above Trenton whose watersheds are entirely within the limits of the State of Pennsylvania and which would be affected by Art. IV. Among them is the Lehigh River, with its drainage area of 1,375 square miles; the Tokickon, with a drainage area of 106 square miles and a storage capacity of 25,000 m.g.; and the Bushkill, having practically the same area and probably the same storage capacity as the Tokickon. The control of these streams is now vested in the Department of Forests and Waters at Harrisburg. Under the compact, control would be transferred to a commission representing three states, of which Pennsylvania is only one, while the interests of the two others are more or less common and even might at times become antagonistic to this state.

When it is considered that the upper Delaware and the Tokickon have been studied as possible sources of supply for Philadelphia, that the tributaries of the Lehigh River furnish the water supply for the growing municipalities in the Lehigh Valley basin and that after the compact is ratified, no municipality within these areas can either increase its water supply or acquire a new local source without the approval of the Tri-State Commission, we may well ask, What has this state gained in exchange for the surrender of these rights?

In regard to the fairness of the allocations made by the proposed compact, Pennsylvania, embracing within its boundaries 52.15 per cent of the entire Delaware River watershed area above Trenton, receives only 42.8 per cent of the amount of water allocated. As the interests of the Metropolitan District of Northeastern New Jersey are nearly identical with those of New York City and its Metropolitan District, a very material advantage is acquired by these districts, while eastern Pennsylvania, embracing one of the most important manufacturing districts in the country, is jeopardizing its industrial future.

The serious disadvantages to Pennsylvania, and in a measure to western New Jersey also, may be summed up as follows: (1) the unequal allotment of the water, which is not in proportion to the areas of the watersheds within the boundaries of the signatory states; (2) the diversion of a large amount of the best quality of water into other watersheds; (3) the surrender by the State of Pennsylvania of its present control of very important tributaries of the Delaware River, which are entirely within the state limits, to a commission of which a majority may not be friendly to the welfare of the state.

Philadelphia, Pa., May 15, 1929. BENJAMIN FRANKLIN, Consulting Engineer.

Burned Clay Cellular Aggregate for Light-Weight Concrete

Sir—Referring to the article, "Burned Clay Cellular Aggregate for Light-Weight Concrete," appearing on p. 746 of the May 9 issue of *Engineering News-Record*, we desire to call your attention to additional important and pertinent information on the subject.

In considering the development of light-weight aggregate from shale or clay, due consideration should be given to the late Oscar Olsen, of Oakland, Calif. Records indicate that Mr. Olsen had a very clear conception not only of the character of the raw material to be used but also of the method of manufacturing and the value and uses of light-weight aggregate. According to these records, he first produced light-weight aggregate early in 1917 and made patent application in 1918; and on Sept. 2, 1919, Patent No. 1,314,752, "Burned Shale and Method of Preparing the Same and Concrete Made Therefrom," was issued to him by the U. S. Patent Office.

The patent referred to in your article is doubtless No. 1,255,878, issued to Stephen J. Hayde on Feb. 12, 1918, on "Process of Making Brick and Similar Articles." A careful review of this patent does not disclose any apparent reference to lightness in weight of the fired shale or clay or to the products made therefrom.

Mr. Olsen was very active in developing his product, but died shortly after his patent was issued and all activity ceased until two or three years ago, when the patent was purchased by W. A. Collings, of California. About two years ago the owners of the Olsen patent brought suit against certain licensees operating under the Hayde patent. The hearing of this case took place in Danville, Ill., in March of this year and a decision may be expected within the next few months.

Another use of burned shale is for the manufacture of asphaltic pavements. Asphaltic pavements when built of ordinary sand and gravel are often non-stable due to the rounded shape of the aggregate. Such pavements have a tendency to wave or otherwise displace. When burned shale aggregate is used, however, the particles are thoroughly interlocked and provide a contour to the pavement that is permanent and desirable. It is not subject to the usual waving or rutting and the asphaltic cement can be used in sufficient excess to waterproof it properly. On account of the spicular, vesicular and porous nature of the material, the asphalt may be mixed in the central asphalt plant with the aggregate in the usual way and then hauled to the point of laying without caking together to the extent that ordinary materials do. This material may be hauled either cold or hot and therefore may be used in very remote places or without the necessity of keeping the asphalt plant running continuously.

Material of this sort is in quite a few respects superior to Kentucky cold-laid rock asphalt and has the advantage that it may be made in almost any locality and weighs slightly less per cubic yard of finished surface. It presents a particularly good surface for automobile traffic and does not tend to become slick. It can be shoveled, smoothly laid on the foundation and rolled into place while cold with nearly as good results as if the asphalt had been laid hot.

Kansas City, Mo., May 21, 1929. SILICA PRODUCTS COMPANY, By K. K WYATT.

News of the Week

Place First Section of Detroit Vehicular Tunnel

The first section of the Detroit and Canada vehicular tunnel has been sunk to a bed of mud 80 ft. below the surface of Detroit River. This is one of ten which will comprise the under-water portion of the $25,000,000 tunnel project. The ten sections vary in length from 220 to 250 ft., with an over-all diameter of 35 ft. Their aggregate length is approximately half a mile, constituting half of the tunnel.

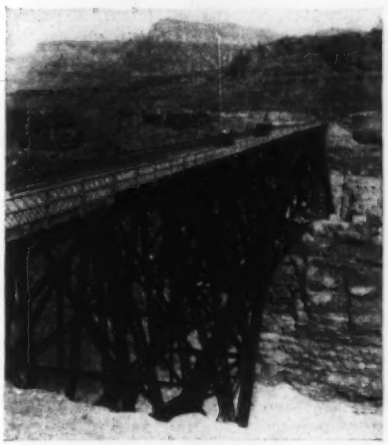
The tubes are being built at Ojibway, Ont., where they are bulkheaded, launched and partly concreted. When submerged to a depth of about 23 ft., each tube is towed upstream to Detroit and anchored near the river-bottom trench. Additional tremie concrete then is poured and, suspended from buoyancy scows, the tube is lowered into place. When launched, the sections weigh approximately 500 tons each. At the time of sinking, each weighs from 7,000 to 8,000 tons.

While being submerged, the section is kept under control by means of a group of anchors which allow lateral movement in any direction. Cables attached to the buoyancy scows also permit exact control of the sinking process. While resting on the river bottom, the tubes can be shifted further. Exact alignment is secured through the use of slender masts attached to the tube and extending slightly above the surface of the water. The tubes are to lie in a 45-ft. trench being excavated from shore to shore. Just before the initial section went down, the trench was swept with a mammoth steel framework to make sure that everything was clear. A bed of sand and gravel from 2 to 4 ft. thick then was placed in the bottom of the trench.

Chicago Steel Erectors Strike

A strike of bridge, structural and architectural iron-workers at Chicago went into effect June 1 over a wage dispute in which the men demanded an increase from $12 to $13 per day. About 3,500 men were said to have quit work on the numerous large buildings now under construction. The former wage agreement expired May 31, and the contractors offered $12.50, but this was refused. According to the Building Employers Association the dispute should have been submitted to the joint arbitration board of this association and the Building Trades Council, thus avoiding the stoppage of work. For the association, it was pointed out that as rents and cost of living have not increased there is no economic reason for higher wages, and the increase was offered as a means of avoiding trouble.

COLORADO RIVER BRIDGE DEDICATED



Formal dedication of the new highway bridge across the Colorado River 7 miles below Lee's Ferry, Ariz., took place June 14-15. The structure, which was fully described in *Engineering News-Record*, Nov. 1, 1928, pp. 646-649, has a total length of 834 ft. and a height of 467 ft. from low water to roadway grade. The reinforced-concrete pavement is 18 ft. between curbs. The bridge was built by the Kansas City Structural Steel Company for the State of Arizona at a cost of $310,000. Material and equipment amounting to approximately 1,600 tons were hauled from Flagstaff, Ariz., 135 miles, by two trucks of 12- and 5-ton capacity at a contract price of $58,000.

Lockport, N. Y. Filtration Plant Assured by Decision

Construction of a modern filtration plant for treating the heavily polluted water of the Niagara River is now assured for the city of Lockport, N. Y., by a decision of the Appellate Division of the New York Supreme Court at Rochester. The plant was authorized November 2, 1926, when the voters of the city approved the issuance of $550,000 in bonds for the filtration plant and a reservoir. However, opposition in the city council prevented the sale of the bonds until an order of mandamus was secured, following which the site was purchased. Last summer bids were received and a contract awarded for the construction of the filtration plant, but the city council failed to authorize the issuance of the additional bonds necessary to provide for construction. A second mandamus order was granted directing the issuance of these bonds, following which the case was carried to the Supreme Court on appeal by certain of the councilmen.

Bonner Executive Secretary of Federal Power Commission

The U. S. Senate on June 15 confirmed the nomination of Frank E. Bonner of Piedmont, Calif., to be executive secretary of the Federal Power Commission. Mr. Bonner succeeds O. C. Merrill, who has resigned to direct the activities of the American Section of the World Power Conference.

Mr. Bonner has had twenty years' experience in government engineering work. For the past seven years he has been district engineer of the Forest Service in California and has been the representative of the Power Commission in that state. His duties there involved the supervision of several of the largest public utility hydro-electric developments in the United States, including the construction of many dams of major size. He has served on the San Gabriel River Commission, the St. Francis Dam Investigation Board and the California Water Resources Advisory Board. He is the author of a recent bulletin which presents a comprehensive plan for the development of the water-power resources of California.

Pasadena Approves Water Bonds

At a special election held June 18 the voters of Pasadena, Calif., approved by a vote of ten to one a $10,000,000 bond issue for the development of a domestic water supply from the San Gabriel River. The proceeds of the issue will be used for construction of the Pine Canyon dam on that river and the building of a conduit 5 ft. in diameter to bring the water to be impounded to the Sunset and Mountain reservoir, a distance of 17.8 miles. Announcement of this special election was published in *Engineering News-Record*, May 30, 1929, p. 883.

N. Y. Multiple Dwelling Law Held Unconstitutional

A decision handed down June 25 by the Supreme Court of New York State holds that the multiple dwelling law passed by the state legislature at its last session is unconstitutional in that it affects only New York City and is thus in conflict with the home-rule provisions of the Constitution. The decision is the first to be rendered in a number of pending suits on the law, which was passed to regulate and control apartment houses and apartment hotels in cities of over 800,000. Such an act, it was held, could be passed by the state legislature only as an emergency measure, requiring a special message from the Governor and a two-thirds vote.

Central State Sewage Works Men Hold Annual Meeting

From 34 members at the first annual meeting in 1928 to more than 100 members in 1929 and with about 50 members in attendance at the second annual meeting held at Indianapolis, Ind., on June 20 and 21, the Central States Sewage Works Association shows good progress and aggressive activity. This association was organized in December, 1927.

At the first session of the Indianapolis meeting reports were presented from seven states as to the present status of sewage treatment. Papers presented included design and operating features of the works at Madison, Wis.; Elgin, Ill., and Princeton, Ill., this last having a system of surface aeration. The new works at Indianapolis were described by Charles H. Hurd, chief engineer of the Indianapolis Sanitary District, and C. K. Calvert, assistant engineer. One afternoon was devoted to an inspection of the works.

Two papers dealt particularly with the sludge problem. The use of concentrated sludge in reducing the period of aeration in connection with the activated sludge process was the subject of a paper by Robert Cramer, chief engineer of the Milwaukee Sewerage Commission, while experiments with sludge treatment at the Calumet works of the Sanitary District of Chicago were described in a paper by A. H. Goodman and C. E. Wheeler. Of a professional rather than a technical character was a paper by Paul Hansen, Chicago, on the relation of consulting engineers to state sanitary engineers in connection with submitting plans for sewerage systems and sewage treatment.

A campaign for a detailed and standardized system of accounts for operating costs of sewage works was urged by Gustave H. Radebaugh, manager of the Urbana-Champaign Sanitary District, not only to insure accurate knowledge but also to permit of making comparisons of the operating cost of different plants on a uniform basis. He described the methods in use by his organization. At his suggestion a resolution was adopted recommending that the Federation of Sewage Works Associations should appoint a national committee to standardize a code of accounting for the construction and operating costs of plants of this kind. For the year 1929-30, the officers include: president, L. S. Finch, sanitary engineer for the Indiana State Board of Health, Indianapolis, Ind.; secretary, Gustave H. Radebaugh, manager of the Urbana-Champaign Sanitary District, Urbana, Ill.

$1,720,000 Tunnel Project Ordered at Vancouver

The Canadian Pacific Railway has been instructed by the Board of Railway Commissioners of Canada to proceed with $1,720,000 tunnel project at Vancouver, B. C. By tunneling beneath downtown streets, the English Bay branch of the C.P.R. from the main line to the False Creek yards will be rerouted and seven grade crossings eliminated. Work must be commenced by Oct. 1, 1929, and completed by Dec. 31, 1930. The project has a total length of 6,140 ft. with 4,600 ft. of tunnel.

Mississippi Floodway Bodies Answer Secretary Good

Commenting on the announcement of Secretary of War Good that he is entirely convinced of the soundness of the Jadwin plan for flood control as to both its engineering and its economic features and that the plan should be pushed to completion as expeditiously as possible, the Missouri and Tensas basin flood-control associations call the Secretary to task for dictatorial methods.

In their statement these associations point out that the expression of opinion of the Secretary is made in the face of the recent petition to President Hoover, signed by the Senators and Representatives from nine Mississippi Valley states, in which it was set forth that the manner in which the present agency was interpreting the act and carrying out the flood-control plan was not in accord with the manifest intent of Congress. These reported expressions are made also in the face of the most positive recommendations of the flood-control committee of the American Engineering Council, representing the opinion of American engineers.

The situation thus created the associations consider especially unfortunate because of the fact that if the Jadwin plan is allowed to be placed in execution without competent, impartial review, the nation takes the risk of a bad investment and the people of the valley of the recurrence of disastrous floods. The responsibility and stigma for such results, it is declared, will rest upon neither the present Secretary of War nor the Chief of Engineers, but squarely upon the shoulders of the President.

GAS-WELDED BUILDING UNDER ERECTION AT NIAGARA FALLS

A new steel-frame building for the Union Carbide Company which is being constructed at Niagara Falls, N. Y., by the oxyacetylene process of fusion welding was exhibited June 19 to about 175 visiting engineers by the Linde Air Products Company, whose engineering department assisted in the design and is supervising the field welding. It is believed that this is the largest building frame which has been designed for and erected by this process of welding. The building, which contains 297 tons of steel, is of the mill type, having a single aisle 75 ft. wide and 260 ft. long, arranged in thirteen 20-ft. bays.

The aisle is spanned by modified compound Fink-type trusses with lower chords 42½ ft. above the floor. Mezzanine operating floors 27 ft. wide extend along one side. In the shop, nine welders worked six weeks in assembling the trusses and columns. Three of these welders are also doing the field welding, joining the half-truss sections received from the shop. All other field assembly is being done by bolts. The illustration on the right shows an ingenious detail of the column base design. Short sections of thick-walled pipe are attached to each edge of the column flanges by double fillet welds, the anchor bolts passing through.

Reduced Budget for Chicago Sanitary District

A budget of $35,000,000 for 1929 has been adopted by the Sanitary District of Chicago, as compared with $58,700,000 in 1928. It provides only for construction work already under way to meet the requirements of the War Department. Except for a $2,000,000 cut in the payroll, the reduction is said to be entirely in the construction program.

Dismissal of N. Y. Engineers Ends Long Controversy

The dismissal of about 300 assistant engineers, transitmen and draftsmen, employees of the Board of Transportation in New York City, which took place on June 18, as noted in our news pages last week, marks the culmination of a long controversy over compensation for engineers in the city employ. Begun many months ago, efforts to increase wages resulted ultimately in the adoption by the Board of Estimate—the city's chief administrative body—of a schedule of higher rates of pay which thereafter became mandatory for city departments, but not for the Board of Transportation, the Board of Water Supply or the Department of Education, whose employees are under state civil service classification. However, the department of Education and the Board of Water Supply voluntarily put the new schedule into effect.

During the early stages of the agitation for increased wages the Union of Technical Men took interest in the negotiations, and after John H. Delaney, head of the Board of Transportation, had indicated that he would not grant pay increases, it held several spectacular demonstrations by the dissatisfied men. These demonstrations gained some publicity for the move but also antagonized Commissioner Delaney and city officials.

Meanwhile, the agitation within the engineering force of the Board of Transportation increased to a point where, according to the officials, the efficiency of the organization was materially reduced. Reorganization of the board on the basis of having fewer and better paid employees to carry on the board's work therefore was undertaken, and about a month ago some 200 men were promoted to higher positions and increased pay, and last week about 300 men were laid off. Incidentally, as part of its reorganization program the board turned over to contractors work which they were supposed to do under their contract but which heretofore had been done by engineers of the force. As a result, some of the men laid off, chiefly assistant engineers and transitmen, have been employed by the subway contractors, generally at better pay.

Commissioner Delaney in declining to grant the increased pay stated that to do so amounted to making promotions without examinations, which the board could not do under the civil service law. As opposed to this the men point to the fact that similar increases were granted by the Board of Water Supply and the Department of Education and that the legality of that action was upheld.

Following the laying off of the men the Union of Technical Men appointed a committee to interview the commissioner, but so far he has declined to meet them because of the activities of the union organizers.

LIGHTNING DAMAGES CONCRETE ROAD

Lightning recently caused minor and occasional damage to 1,900 ft. of concrete pavement at Circleville, Orange County, N. Y. The bolt first struck a windmill near the road, then, apparently, entered the steel reinforcement of the concrete road, traveling thus throughout the entire length affected. At practically every expansion joint some damage was done, varying from a mere displacement of the joint material to a shattering of the concrete, a typical instance of which is shown in the photograph. Most of the damaged areas were 6 to 8 in. wide and 1¼ to 2 ft. long. A closed automobile which was traveling on the road at the time sustained several broken windows and a short circuit in the electrical system, but the occupants were uninjured.

Providence Water Supply Board Retired at Own Request

In view of the practical completion of the new $21,000,000 Scituate water supply system for Providence, R. I., the water supply board which has had charge of the work since 1915 requested that its members be relieved from further duty and that authority over the new system be transferred to the commissioner of public works. The city council, in following this suggestion, publicly thanked the members of the board for their services and presented each with a bronze plaque with a suitable inscription. The new Scituate system consists of an impounding reservoir on the Scituate River, a mechanical filtration plant and a supply conduit, as well as a distributing reservoir in the city.

Vancouver, B. C., to Spend $5,500,000 on New Work

Taxpayers of Vancouver, B. C., have approved an expenditure of $5,500,000 for improvements in that city. Under the plans indorsed, $1,000,000 will be spent for sewers, $500,000 for main thoroughfares, $500,000 for streets and roads, $750,000 for water-works and $800,000 for school buildings. Among important measures defeated were those covering the proposed construction of Burrard bridge across False Creek, for which $3,000,000 had been asked, and a new city hall which was to have been erected at an estimated cost of approximately $1,000,000.

Changes in International City Managers Association

Coincident with the transfer on June 1 of the headquarters of the International City Managers Association from Lawrence, Kan., to quarters furnished by the University of Chicago at 923 East 60th St., Chicago, Ill., Clarence E. Ridley became executive secretary of the association. Mr. Ridley succeeded John G. Stutz, who resigned to give his entire time to the secretaryship of the League of Kansas Municipalities. Mr. Ridley was at one time city manager of Bluefield, W. Va., and has just resigned as consulting engineer to the National Institute of Public Administration.

St. Louis to Retain Bartholomew as Consulting Engineer

The resignation of Harland Bartholomew, engineer for the St. Louis, Mo., City Plan Commission, will be accepted by that body provided he will continue with the commission in the capacity of consulting engineer. The commission so decided at a meeting held June 4. E. J. Russell, chairman, stated that Mr. Bartholomew, who has been engineer for the body the past thirteen years, has consented to serve as consulting engineer. If he does so he will be continued at the $4,000 annual salary now paid him, but will not be required to devote so much of his time to the commission's work.

Take Bids on High-Head Turbines

Specifications have been issued by the Pacific Gas & Electric Company, San Francisco, for bids on one 13,500-hp. vertical Francis turbine for 244 ft. maximum static head, and one 11,000-kva. alternating-current generator for installation in its Salt Springs power plant; and also for two 36,000-hp., 1,190-ft. effective head double overhung impulse waterwheels, and two 30,000-kva. alternating-current generators for its Tiger Creek power plant. These plants will be the first of a chain of four which will comprise the company's Mokelumne River project.

Pre-Qualification Law Enacted by California

Governor Young of California has given his approval to the so-called contractors' pre-qualification bill, and it will become effective Aug. 15, 1929. Under the terms of the bill, which is an amendment to the state contracts act, the Department of Public Works may require from any person proposing to bid on duly advertised public work answers to questions contained in a standard form of questionnaire, and a financial statement, including a complete statement of the person's financial ability and experience in performing public work, before furnishing such person with plans and specifications for the proposed work. Whenever the department is not satisfied with the answers and the financial statement, it may refuse to furnish the plans and specifications, and the bid of any person to whom plans and specifications have not been issued must be disregarded. The word "person" is defined as including individuals, co-partnerships, associations, corporations or joint stock companies and their representatives, trustees or receivers appointed by any court of competent jurisdiction.

State Ownership of Toll Bridges New California Policy

State ownership of all toll bridges, including the acquisition of existing privately owned bridges, was established as the policy of the State of California in a series of bills signed by the Governor June 10. The bills provide authority for financing construction costs or purchase price by the issuance of revenue bonds to be retired from tolls. The program includes the much discussed San Francisco Bay bridge, placing this proposed structure under state control. This legislation was the result of recommendations in a report made by the California State Highway Commission on the existing privately owned toll bridges. An abstract of this report appeared in *Engineering News-Record*, April 11, 1929, p. 606. The general provisions of the new state policy are:

The California Toll Bridge Authority is established, composed of the Governor, Lieutenant-Governor, Director of the Department of Public Works, Director of Finance, and the chairman of the California Highway Commission. This board is authorized to direct the Department of Public Works to build toll bridges and to acquire the existing ones by purchase or by eminent domain proceedings. The authority is further empowered to issue revenue bonds to cover the cost of such construction or acquisition. These bonds are to be secured solely by the revenue of such bridges and shall not constitute a debt or general obligation against the state. Rates of tolls are to be fixed by the authority sufficient to meet operating expenses, maintenance costs and the retirement of bonds with the purpose of making the bridges toll free as rapidly as practicable. Exclusive jurisdiction over toll bridges and toll roads is vested in the state Department of Public Works, including authority to grant franchises and licenses and to take tolls, protection being granted to the rights of toll bridges now in operation and existing franchises. The jurisdiction of counties to grant franchises for toll bridges is terminated. The authority is empowered to lay out, acquire and construct a highway crossing from San Francisco to Alameda County, the cost to be paid by revenue bonds or by aid extended by any city or county.

Chicago Abandons Garbage Reduction Plant

High cost of operation of the Chicago municipal garbage reduction plant, combined with the recent opening of an incinerator, has led to a decision to abandon it on June 30. The plant was taken over from a contractor several years ago but has shown generally an annual deficit, while a report published in 1921 (*Engineering News-Record*, May 19, 1921, p. 856) stated that for the six years 1915-1921 a net profit was made in only one year. Since the opening of the new garbage incinerator described in *Engineering News-Record* of Aug. 23, 1928, p. 287, the amount of garbage sent to the reduction plant daily has decreased to about 10 per cent of its 500-ton capacity, with consequent increase in operating cost, said to have reached nearly $10 per ton, as against $5.75 for incineration. A temporary contract has been awarded for hauling excess garbage to outlying points, but a second incinerating plant is proposed, to serve the southern part of the city.

Terzaghi Resigns From M.I.T.

Dr. Charles Terzaghi has resigned the position of professor of foundation engineering at Massachusetts Institute of Technology in order to accept a call to the Technische Hochschule, Vienna, Austria. He will continue his research work in the field of soil properties and soil mechanics in his new position, where liberal facilities will be provided for the purpose. Dr. Terzaghi has been at Cambridge since 1925, coming there from Robert College, Constantinople, Turkey, where he had been carrying on soil research for seven or eight years. Prior to that time he had been engaged in practical foundation engineering in Austria and Russia, and had also spent some time in the United States in engineering work on the west coast. During his service with the Massachusetts Institute of Technology he has acted as consulting engineer on subgrade and foundation matters for the U. S. Bureau of Public Roads and other highway authorities, and has also been consultant to numerous power companies, municipalities and engineering firms on foundations, embankments and other soil subjects.

Brief News

CINCINNATI, OHIO, has awarded a contract for the construction of a 300-ton incinerator to the Superior Incinerator Company of Dallas, Texas, for $251,000.

SURVEYS for the proposed Chignecto Canal in Nova Scotia have been commenced. Work will begin on the Tignish-Baie Verte end and will proceed across the 18 miles of isthmus to the Aulac-Laplanche terminal, including an area from 3 to 6 miles wide.

MORE THAN 40,000 trees are to be planted this year by the Chicago, Burlington & Quincy Railroad in an effort to protect and beautify its right of way west of the Missouri River. The trees will be in three rows on each side of the tracks.

A SURVEY to study means of eliminating the delay to traffic on the New York State barge canal caused by the combination of low bridges and high water, instances of which occur every year, has been begun by the State of New York.

PORT DEVELOPMENT at a cost of over $10,000,000 has been assured for Vancouver, B. C., harbor by the recent passing of harbor estimates by the Canadian government. It is proposed to add grain elevators with a capacity of 7,500,000 bushels, a fish storage plant and a cold storage plant.

CONSTRUCTION has been started on a transmission line 11 miles long from the Lighthipe substation of the Southern California Edison Company to a new substation between Torrance and Redondo Beach, Calif. The line will carry 220 kv. The cost of the line will be $370,430 and that of the substation $575,000. Contract for the steel towers was awarded to the Emsco Derrick & Equipment Company, Los Angeles, Calif.

BIDS WILL BE OPENED July 16 for the construction of the Deadwood dam of the Payette division, Boise project, U. S. Reclamation Service in Idaho. The work will involve the construction of the dam, clearing of the reservoir site and the building of a construction road.

A BILL providing for a $10,000,000 bond issue for the improvement of San Francisco harbor has been signed by Governor Young of California. The proposition will be placed on the ballot at the next general election in November, 1930, for the approval of the voters of the state.

PREPARATION of a comprehensive city plan for Rochester, N. Y., has been authorized by unanimous vote by the City Council. The work is to be done by Harland Bartholomew & Associates, St. Louis, Mo., at a cost not to exceed $60,000. That sum is to include the services of as many city employees as is feasible.

WASHINGTON NOTES

By Paul Wooton
Washington Correspondent

Fuse-Plug Raising Decision Refused—Committee to Study Grade-Crossing Protection

NO DECISION was taken by the War Department on the application of the Tensas Levee Board to raise the fuse-plug levee at the head of the Boeuf Basin. In a letter referring to the application written to Senator Ransdell, of Louisana, the Secretary of War says:

It is believed that the land on which the levee line in question rests belongs to the Southeast Arkansas Levee District and that this levee district owns either all or part of the levee. The question, therefore, seems to be one first between the levee district in Louisana and the levee district in Arkansas.

The most recent occurrence which might be considered a precedent in this matter is the situation now existing in the Mississippi Valley. Local interests throughout the valley are sandbagging and strengthening their levees without consulting the War Department except where they desire the financial aid of federal funds.

In 1927, when local interests desired to breach a levee below New Orleans, they consulted the Secretary of War and he answered to the effect that the War Department had no objection but could not assume responsibility for any damages resulting therefrom.

This, in the opinion of Senator Ransdell, is a complete evasion of the issue. Representative Wilson, the ranking minority member of the flood-control committee, says it took the War Department a long time to say nothing. He points out that the Arkansas Levee District is even more insistent upon the raising of the fuse plug than is the Tensas Levee Board.

At the Corps of Engineers it was learned unofficially that the question is one involving the State of Arkansas and that it would be desirable to know the attitude of the Governor of that state toward the proposal to raise the fuse-plug sector. The feeling there is that a hypothetical proposition has been made for the purpose of securing a statement from the corps that could be used in connection with pending litigation. Under such circumstances an opinion will not be rendered without thorough study and formal legal consideration.

Jadwin to Retire Soon

Indications in Washington are that Brig.-Gen. Herbert Deakyne will be the successor of Major-Gen. Edgar Jadwin as Chief of Engineers. General Jadwin reaches the retirement age Aug. 7. While some efforts are being made to secure the place for other officers of the corps, no impressive reason seems to have been advanced as to why the place should not go to General Deakyne. The opponents of the Jadwin plan of flood control are convinced that General Deakyne has his own ideas in connection with that project. Since he has not been consulted in connection with it, it is thought he will feel no hesitancy in recommending such changes as he may think advisable.

In the meantime the fight for second place goes on actively. Col. Harley B. Ferguson and Col. William P. Wooten are regarded as the most likely officers to receive the nomination. Interests on the west bank of the Mississippi are quite generally advocating the appointment of Colonel Wooten, but his support is not confined to that area. So far as is known he would be entirely acceptable to the interests on the other side of the river.

A large number of letters reaching the Secretary of War give an indication of the large following enjoyed by Colonel Ferguson. There has been no suggestion from the west bank that Colonel Ferguson will not be acceptable to the people there should he be named.

It is admitted that it is well within the range of possibility that there may be no departure from the regular progression in order of seniority. In that case the appointment would go to Col. Charles W. Kutz, at present stationed in the Philippines. Colonel Kutz is understood to feel that there is no valid reason for skipping him, and his friends are active in his behalf.

Expect New Orleans Bridge Decision

A second decision on the Hero-Hackett bridge project at New Orleans is expected to be handed down by July 1, following the receipt by the army engineers of the final report of the special board that has been studying the matter. Nothing has been indicated so far to make it seem that the Chief of Engineers will depart from his former ruling that a bridge at the location proposed would restrict the flow of commerce through a major port.

It has been the contention of the War Department that New Orleans, as the principal ocean outlet for the Mississippi Valley, should not have its port facilities cut in half by a bridge of any type. Due to the claim of backers of the project, however, that the greater amount of the port development is below the site where it is proposed to erect the bridge, the matter has been reopened. The board of engineers has been requested to submit complete statistics showing the use of the port facilities above and below the bridge site. It is this report that has just been received.

Just what the report contains has not been revealed, but it is understood that information has been compiled showing that a greater amount of money has been spent on port improvements above the site than below it. On the other hand, it is believed that the figures will show that the amount of shipping using the lower section of the harbor is about equal to that using the section above the proposed location for the bridge, if the amount of tonnage that goes past the city is not taken into consideration. It is agreed on all sides that if the bridge interests would apply for a location farther upstream, the prospects of approval would be materially greater. Such action is thought to be unlikely, however, since it is realized that a bridge farther upstream would not be able to attract sufficient traffic to make it a paying proposition.

Progress on Boulder Dam Project

The Boulder dam project act became effective, according to the terms of the law, on June 21 and on June 25 President Hoover issued a proclamation to that effect. Now the Secretary of Interior will be able to proceed with power and water contracts. Appropriations for construction cannot be made until such contracts are sufficient to amortize the work within 50 years of completion. A similar procedure is to be followed on the All-American Canal.

Secretary Wilbur and Elwood Mead, Commissioner of Reclamation, went to the site on June 22 and viewed the reservoir area by airplane. Personnel of the Bureau of Reclamation are now engaged in preliminary surveys. Engineers of the bureau and of the Union Pacific Railroad are in consultation regarding a branch line to be built to Black Canyon dam site from a point on the main line near Las Vegas.

Grade Crossing Dangers

Emphasis on the mitigation of the dangers of grade crossings through the provision of better protection was sounded as the keynote of its campaign by the newly formed grade-crossings committee of the National Conference on Street and Highway Safety during a recent meeting in Washington. This policy was decided on as being more practicable and more certain of immediate results than would be a campaign for grade elimination. Preparation of detailed plans for providing better protection at the nation's grade crossings was placed in the hands of various subcommittees that will specialize in the several phases of the work.

The broad classifications under which the program has been divided include such items as reduction of the physical hazards at the crossings, protection by the various standard devices and the drafting of uniform rules for the operation of vehicles at the crossings. Attention is being paid also to the working out of a program to bring about better protection at the intersections of major highways. This work is divided similarly.

It is not the committee's intention to spend much time over grade-crossing problems as they pertain to cities and suburban sections. Instead, the work will be concentrated on rural crossings. During preliminary discussion of the program it was agreed that steps should be taken to oppose the opening up of needless crossings in connection with new highway building. Inasmuch as the Bureau of Public Roads is vested with the authority to supervise highway plans where federal aid is desired, it was pointed out that it may be advisable if the bureau were asked to disapprove plans where a highway is carried across the same railroad tracks a number of times in a short distance.

Engineering Societies

CALENDAR

ANNUAL MEETINGS

AMERICAN SOCIETY OF CIVIL ENGINEERS, New York; annual convention, Milwaukee, Wis., July 10-12.

AMERICAN ASSOCIATION OF ENGINEERS, Chicago; annual meeting, Mexico City, Aug. 26-28.

* * *

THE SAN FRANCISCO SECTION of the American Society of Civil Engineers held its regular bimonthly meeting on June 18, at which Otto Von Geldern, consulting engineer, spoke on "Reminiscences of the Pioneer Engineers of California."

THE NEW ENGLAND WATER WORKS ASSOCIATION nominating committee announces the following nominations for officers of the association for 1929-30: president, Robert Spurr Weston, Boston, Mass.; vice-president, George C. Brehm, Waltham, Mass.; treasurer, Albert L. Sawyer, Haverhill, Mass.

THE ROCHESTER ENGINEERING SOCIETY at its annual meeting elected the following officers: president, C. Storrs Barrows; first vice-president, Virgil M. Palmer; second vice-president, Harry E. Gordon; recording secretary, Edward G. Eidam; treasurer, Howard Harding.

THE ILLINOIS ASSOCIATION OF SANITARY DISTRICTS will hold its annual meeting at Springfield, Ill., on July 9 and 10. Its program includes the dedication of the city's activated-sludge sewage works. H. F. Ferguson, chief engineer of the Illinois Department of Public Health, Springfield, Ill., is president of the association.

THE AMERICAN PUBLIC HEALTH ASSOCIATION announces that the first award of the Sedgwick Memorial Medal will be considered in 1929. This award was established in honor of the late Prof. William Thompson Sedgwick, a former president of the American Public Health Association, and is to be awarded for distinguished service in public health.

THE OHIO HIGHWAY CHAPTER, Associated General Contractors of America, has been formed by a group of highway contracting firms in that state. Robert L. Wager, Sandusky, is president; George S. Mellert, Medina, vice-president; R. L. Fauver, Lorain, secretary; E. C. Lewis, Lima, treasurer, and C. H. Duncan, Columbus, executive secretary.

THE LOS ANGELES SECTION, American Society of Civil Engineers, held its regular monthly meeting June 12, at which F. R. McMillan, director of research for the Portland Cement Association, discussed briefly the problems encountered in the association's work, and Laurence L. Hill, an authority on the history of Los Angeles, told of interesting incidents of early Los Angeles. The meeting was then taken over by the sanitary group of the local section, which presented the following papers: "Treatment of Municipal Water," by Ray L. Derby; "Sanitation of Watersheds," by Dr. J. L. Pomeroy; and "Utilization of Water Reclaimed in Sewage - Treatment Plants," by R. V. Orbison. Each paper was followed by a short discussion from the floor.

THE AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS has elected officers for the coming year who were inducted at the annual meeting in Dallas, Tex., June 24-27. These are as follows: president, W. G. Keiser, assistant manager cement products bureau, Portland Cement Association; vice-presidents, Arthur Huntington, public relations engineer, Iowa Railway & Light Corporation, and F. W. Duffy, associate professor of agricultural engineering, University of Wisconsin.

Personal Notes

GEORGE L. WATSON, New York City, consulting engineer, has been awarded the degree of Doctor of Engineering by Rutgers University, New Brunswick, N. J.

FREDERICK STUART GREENE, New York State Commissioner of Public Works, has received the honorary degree of Doctor of Engineering from Syracuse University.

FRANK EDWARD WINSOR, chief engineer of the Metropolitan Water Supply Commission in Massachusetts and formerly chief engineer of the Providence Water Supply Board, has received the honorary degree of Doctor of Science from Brown University.

EMMETT P. GRIFFIN, superintendent of the East St. Louis, Mo., Park District, was reappointed by the park district board of trustees on May 31. As superintendent of the district Mr. Griffin is in charge of the preparation of architectural and engineering plans for all construction undertaken by the district, and also supervises such construction.

HOMER M. HADLEY has been appointed regional structural engineer for the Pacific Coast for the Portland Cement Association. Mr. Hadley will act in an advisory capacity to architects and engineers for the territory of California, Nevada, Arizona, Oregon, Washington and British Columbia. FRANK J. BARRETT, for the last nine years office manager and field engineer in the Seattle office, has been appointed to succeed Mr. Hadley as the association's district engineer in Seattle.

Col. MAX C. TYLER, Corps of Engineers, formerly in charge of the District of Columbia Water Supply System and later in charge of construction work at Muscle Shoals, Ala., will shortly assume the duties of chief engineer of the Federal Power Commission in Washington, D. C., as the relief of Major G. E. Edgerton, Corps of Engineers, who has been assigned to other duties.

Capt. WILLIAM H. CROSSON, U. S. Engineers, has been ordered to Washington for duty as assistant engineer of the Federal Power Commission.

JACK FULLER, assistant city engineer of Portsmouth, Ohio, has resigned to enter into a partnership in Cleveland with George F. Gascoyne. The firm will engage in general engineering work.

W. G. URE has been appointed city engineer for Woodstock, Ont., to succeed his father, the late F. J. Ure, who held that position for 28 years.

ROBERT RIDGWAY, chief engineer of the New York City Transit Commission and past-president of the American Society of Civil Engineers, received the honorary degree of Doctor of Engineering from Lehigh University at the recent commencement.

ABEL WOLMAN, chief engineer of the Maryland Department of Health, will give a series of lectures on public health engineering in the department of bacteriology and hygiene at the University of Chicago during the second period of the summer course.

RAY S. PALMER, for the past eight years superintendent of highways and the water department at LeRoy, N. Y., has resigned to accept a position with the Paradon Manufacturing Company, of Arlington, N. J., manufacturer of chlorine apparatus.

F. M. TOWNSEND, formerly locating engineer with Kennedy & Carey on the Cochabamba-Santa Cruz Railway, is now employed as locating engineer for R. W. Hebard & Company on the Bucaramanga-Rio Fonce section of the Ferrocarril Central del Norte at Bucaramanga, Colombia.

E. DELOS CRUMB, formerly park engineer on the staff of the Finger Lakes State Parks Commission, Ithaca, N. Y., has resigned to accept a position with the Flintkote Company of New York City.

Brig. Gen. CHARLES KELLER, U. S. Army, retired, has been engaged by the Cleveland, Ohio, Chamber of Commerce to prepare a plan to make the Cuyahoga River navigable from Cleveland to Lake Erie.

Obituary

HENRY C. HARRISON, 79 years old, died on June 10 at his home in San Antonio, Tex. Mr. Harrison conducted a survey for a Pacific-Atlantic canal across Nicaragua for the United States government before it was decided to build the canal through Panama.

Construction Equipment and Materials

Building Pontoon Gate Lifter for Welland Canal

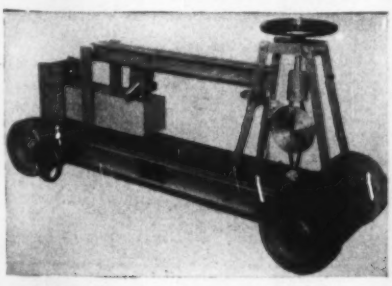
Damaged lock gates on the new Welland Canal will be removed and replaced by a pontoon gate lifter with a capacity of 500 tons now being built by the Wellman-Seaver-Morgan Company, Cleveland, Ohio. This will be provided with four separate electric hoisting units of 125 tons capacity each. The hoisting motors will be operated in parallel by a single control and provided with dynamic braking to control the lowering motion accurately. The hull of the pontoon will be provided with both permanent and movable ballast, the latter in the form of tanks which can be filled or emptied with water by means of a motor-driven centrifugal pump. A steam-driven generator plant, located on the pontoon, will provide electricity for power.

New lock gates for replacement purposes will be floated to their final location in a horizontal position. Upon arrival at the locks the gate-lifting crane, after first removing the damaged gate leaf, will lift the new leaf from its floating position to a vertical position and place it upon its pintle. Each leaf is provided with four heavy lifting eyes for this purpose.

Concrete Beam Testing Machine for Highway Engineers

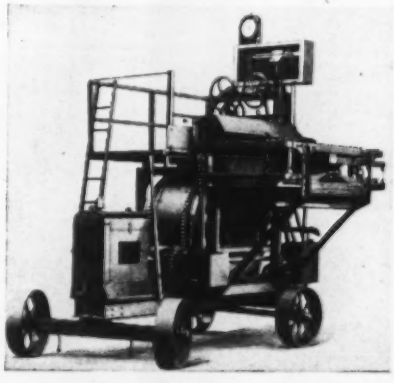
A new concrete beam testing machine, for use by highway engineers, has been developed by the Tinius Olsen Testing Machine Company, Philadelphia, Pa. Tests of beams can be made to supplement the cylinder tests.

The machine is designed for a beam 6x6 in. in section by approximately 36 in. long. The beam is tested in the form of a cantilever, as shown in the accompanying illustration, the load being applied either 10 or 12 in. from the point of support, as desired. The hand wheel on the left provides for inserting or removing the specimen. The load is applied by operating the horizontal hand wheel at the right until rupture occurs, when the maximum load is indicated by a set pointer on the dial. The machine has a capacity of 1,000 lb., and stops are provided to protect the instrument at the rupture point of the specimen. The length of the testing machine is 5 ft. 8 in.; its breadth 2 ft. 1 in., its height 2 ft. 10 in. and its weight 450 lb.



New Concrete Mixer Fitted for Weighing

A new mixer called the "Weigh Mix" has been recently developed by the Koehring Company of Milwaukee, Wis. It consists of a standard mixer equipped with a weighing batch hopper and water tank mounted on an auxiliary frame carrying pipe lever scales. All operations are controlled from the operating platform by one man. Materials are weighed into one hopper, and the water, weighed on the same beam, is carried in an open tank. By mounting the weighing batch hopper on the mixer, head



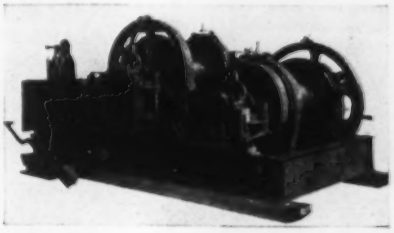
room is reduced as compared with the use of independent weighing or measuring devices, according to the manufacturer.

When the batch hopper door opens to allow for the charging of the mixer, the batchmeter is actuated and the hopper shaking device is started. The batch hopper does not come in contact with the weighing mechanism while being shaken. The scale beam is boxed so that it can be taken off the plant for transportation.

A New Two-Speed Slackline Excavator Hoist

In addition to the line of hoists that have been manufactured by Street Brothers Machine Works, Chattanooga, Tenn., for the past 25 years, there has recently been added a new two-speed slackline excavator hoist. The company has made the main parts of the frame which support the drum housing, drums, and power plant of extra heavy I-beams, having the upper flange reinforced and planed to form a true seat for the drum housing. It was felt that special care should be used to make the base rigid in order to keep the working parts in strict alignment under the constant vibration of working conditions. Side members are joined together by structural steel cross-members and gusset plates on both top and bottom in each corner.

The drums are made in three pieces, there being the barrel and two flanges,



this construction being claimed to absolutely eliminate shrinkage strain; also replacement of either barrel or flanges can be made at nominal cost.

The tensioning drum and the low speed friction are driven by outside band friction. The speeds, being comparatively low, require great pulling power and the band friction has been found best by the company. The friction on the high speed is of the disk clutch type, assuring smoothness of acceleration after the bucket is out of the cup. Gears are of steel with wide base and coarse pitch and with cut teeth. Pinions are of forged steel with machine-cut teeth.

Business Notes

H. E. Green, Philadelphia, Pa., who has represented the McMyler Interstate Company for several years, has started his own business in Philadelphia. He will distribute Moore speed cranes and shovels and Lakeside Bridge & Steel Company products.

Copperweld Steel Company, Glassport, Pa., has formed a southeastern district comprising Georgia, Alabama, Tennessee, Florida, Mississippi and part of Louisiana, with P. A. Terrell in charge as district manager.

William Pike Company, Detroit, Mich., distributor of Howe scales, announces that M. H. Starr, formerly chief engineer of the Howe Scale Company, is now associated with the Pike company as sales engineer. Mr. Starr is also retained as consulting engineer for the Howe Scale Company.

Oliver Ames, senior member of the board of directors of the General Electric Company, died at his home in North Easton, Mass., June 18. Mr. Ames, 65 years old, had been a member of the board since 1893, being elected at that time to fill the vacancy caused by the death of his father, who previous to the formation of the General Electric Company was a director of the Thomson-Houston Company.

New Publications

Road Surfacing—BARRETT COMPANY, New York City, treats of the use of Tarvia Re-Tread for highway resurfacing in a 28-p. illustrated booklet.

Diesel-Driven Air Compressors—SULLIVAN MACHINERY COMPANY, Chicago, Ill., discusses the advantage of the oil-engine drive for angle compound air compressors in bulletin 83-L. Illustrations show typical installations.

Illumination—PITTSBURGH REFLECTOR COMPANY, Pittsburgh, Pa., has issued a 65-p. illustrated book, "Floodlighting," outlining the principles of night illumination of building exteriors, monuments, construction areas, railway yards, airports, etc., and describing Permaflector floodlighting units.

Concrete Treatments—TRUSCON LABORATORIES, Detroit, Mich., is issuing a series of six specification books for engineers and architects, taking up the following subjects: (*A*) Waterproofings, Dampproofings, Oilproofings; (*B*) Floor Treatments; (*C*) General Cleaning Requirements; (*D*) Industrial and Technical Finishes; (*E*) Steel Coatings; (*F*) Architectural Varnishes. These are separately bound in the standard A.I.A. size of 8½x11 in., and are illustrated. The company has also issued a smaller 28-p. booklet, "Science and Practice of Integral Waterproofing." This contains an illustrated and detailed discussion of the theory and practice of waterproofing concrete as applied to basements, subways, standpipes, reservoirs and masonry structures of all kinds.

Construction, Labor and Material

Four Months' Activity in the Materials Industries

Demand and production figures now available in a number of industries allied with construction reflect the depressed condition of small buildings and the strong activity in engineering construction. Softwood, cement, brick, terra cotta, all report smaller movements than in the first four months of 1928. The same condition is reflected in orders for porcelain plumbing fixtures, enamel and sheet metal ware. Steel furniture and shelving, on the other hand, which are sold chiefly for installation in high class commercial buildings, showed greater movement than a year ago.

The stirring conditions that have existed in the steel industry this year are confirmed by the figures for orders, shipments and production of steel products. Shipments and production of steel barrels are exactly the same—14.9 per cent greater in number of barrels than last year. Steel ingots are up 11.9 per cent, while structural steel shipments are 22.3 per cent greater with orders 28.3 per cent above the tonnage ordered last year.

	—Jan. 1 to May 1— 1928	1929	Per Cent Changes From 1928
Boxboard:			
Production, (tons)	864,167	983,399	+13.8
Orders, tons	875,636	986,153	+12.5
Brick, common:			
Shipments, (No.)	722,562,000	551,618,000	—23.6
Cement:			
Production, (bbl.)	42,256,000	42,011,000	— 0.5
Shipments	36,546,000	34,587,000	— 5.5
Enameled Sanitary Ware:			
Shipments, (No. of pieces)	1,376,885	1,203,561	—12.4
Orders	1,817,702	1,307,182	—28.2
Enameled Sheet-Metal Ware:			
Shipments, (doz.)	1,486,442	1,731,450	+16.9
Fabricated Steel Plate:			
Orders, (tons)	182,794	189,933	+3.8
Galvanized Sheet-Metal Ware:			
Production, (doz.)	832,230	885,485	+6.3
Shipments, (doz.)	848,451	905,202	+6.7
Lumber, Softwoods, Weekly Average Per Mill:			
Production, (ft. b.m.)	683,000	581,000	—14.9
Shipments, (ft.b.m.)	715,000	605,000	—15.3
Orders, (ft.b.m.)	761,000	641,000	—15.7
Malleable Castings:			
Production, (tons)	259,881	314,709	+21.1
Shipments, (tons)	252,668	310,633	+23.0
Orders, (tons)	259,091	323,315	+24.8
Porcelain Plumbing Fixtures:			
Shipments, (No. of pieces)	54,324	43,666	—19.8
Orders, (No. of pieces)	133,798	54,204	—308.0
Railroad Locomotives:			
Shipments, (No.)	222	142	—36.0
Steel Barrels:			
Production, (No.)	2,299,532	2,639,639	+14.9
Shipments, (No.)	2,294,991	2,631,001	+14.9
Steel Furniture:			
Shipments, (No. of pieces)	11,856,178	12,625,843	+6.8
Orders, (No. of pieces)	12,742,699	12,717,052	—0.2
Steel Shelving:			
Shipments, (No. of pieces)	2,909,974	4,117,613	+41.7
Orders, (No. of pieces)	3,091,814	4,260,093	+38.0
Steel Ingots:			
Production, (tons)	16,846,958	18,812,637	+11.9
Steel, Fabricated Structurals:			
Shipments, (tons)	900,900	1,101,100	+22.3
Orders, (tons)	966,350	1,239,700	+28.3
Terra Cotta:			
Orders, (tons)	49,923	44,236	—11.4
Floor and Wall Tile:			
Production, (sq.ft.)	19,962,912	24,035,220	+20.6
Shipments, (sq.ft.)	19,306,815	20,078,641	+3.6

Lumber Uses in Other Countries to Be Studied

Recognizing that successful exporting of a product calls for knowledge of how such a product is used abroad, the Department of Commerce lumber export executive committee has recommended that a study be made by the Lumber Division and the department's 56 foreign offices to determine how American lumber exporters can improve their service and whether American woods are being properly used. A study of this kind has been made at home, and its success has indicated the desirability of similar work abroad. It is already known that American lumber does not always give complete satisfaction, because it is exported green. For this reason it may be desirable for American dry kiln manufacturers to introduce their kilns in foreign countries so that the American shipments may be dried.

A certain amount of preparation has already been made. Manuscripts of bulletins on Douglas fir and Southern pine for foreign distribution by exporters and a handbook on lumber exporting have been completed. In addition to these, reports on methods of importing lumber into South America, Germany, Italy and Spain have been brought to date, and tariffs on sawed lumber for all countries and a new directory of exportesr of American lumber have recently been issued.

Shifts in U. S. and British World Trade Since 1913

Recent comparisons of American and British foreign trade show the former to have gained 71 per cent since 1913, while that of the United Kingdom has declined 33 per cent in the period. American exports have climbed steadily since 1923, when they were 15 per cent higher in volume than in 1913. They are now 64 per cent above the base year. In 1923 British exports were 25 per cent below the 1913 volume and in 1928 were 19 per cent below. This relative difference between export volumes of the two countries is not constant throughout the world. It is natural to find a British preponderance in Africa, Asia and Australia. The United States furnishes 9 per cent of the imports of South America, the United Kingdom 7.4. In Europe the United States leads by 20 per cent, and in North America by 45 per cent.

E. N.-R. Index Numbers

Cost		Volume	
June 1, 1929	**205.65**	**May, 1929**	**335**
May 1, 1929	205.15	April, 1929	332
June 1, 1928	206.15	May, 1928	299
Average, 1928	206.78	Average, 1928	287
Average, 1927	206.24	Average, 1927	263
1913	100.00	1913	100

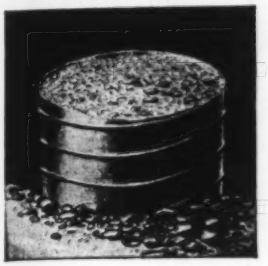
This Week's Contracts

Heavy construction contracts, reported by *Engineering News-Record* in the week of June 27, with some comparisons, total as follows:

(In Thousands of Dollars)

	June 27, 1929	June 20, 1929	June 28, 1928
Building:			
Industrial	$14,284	$8,541	$5,396
Commercial	25,209	53,181	73,145
Streets and roads	14,555	15,133	21,520
Other eng. constr.	10,507	9,506	25,690
Total	$64,555	$86,361	$125,751
Total, all classes, Jan. 1 to June 27:			
1929			$2,242,685
1928			1,773,936

RAYMOND



Here you see

what the Engineer and Contractor sees of a finished Raymond Concrete Pile, after installation—simply the top of the spirally reinforced steel shell filled with concrete.

and below you see

the sections of the shell itself before they are put together —and driven—and left in the ground as a solid, substantial, pressure-resisting hollow steel "form" (whose interior can be inspected). This is the famous Raymond Method of installing tapering concrete piles . . . every pile poured into a spirally reinforced steel shell that is left in the ground.

CAST IN PLACE PILES
COMPOSITE PILES
PRECAST PILES
PIPE PILES

A form for every pile
A pile for every purpose

BUILDING FOUNDATIONS
BULKHEADS AND DOCKS
UNDERPINNING ETC.
BRIDGES

RAYMOND CONCRETE PILE COMPANY

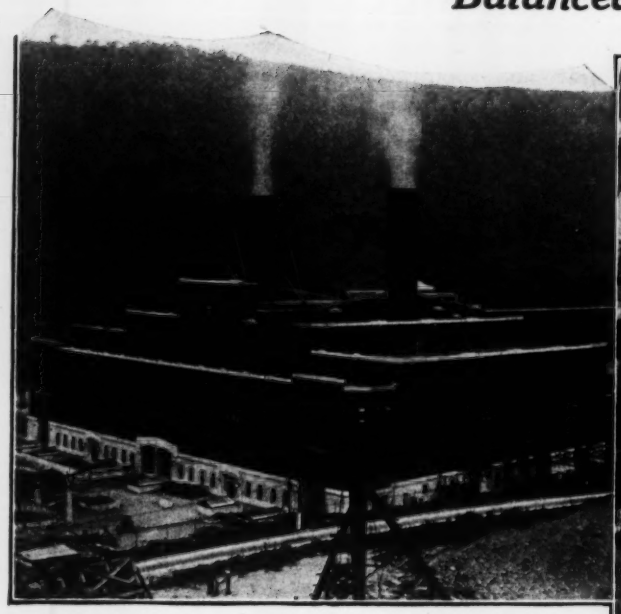
NEW YORK: 140 Cedar Street CHICAGO: 111 West Monroe Street

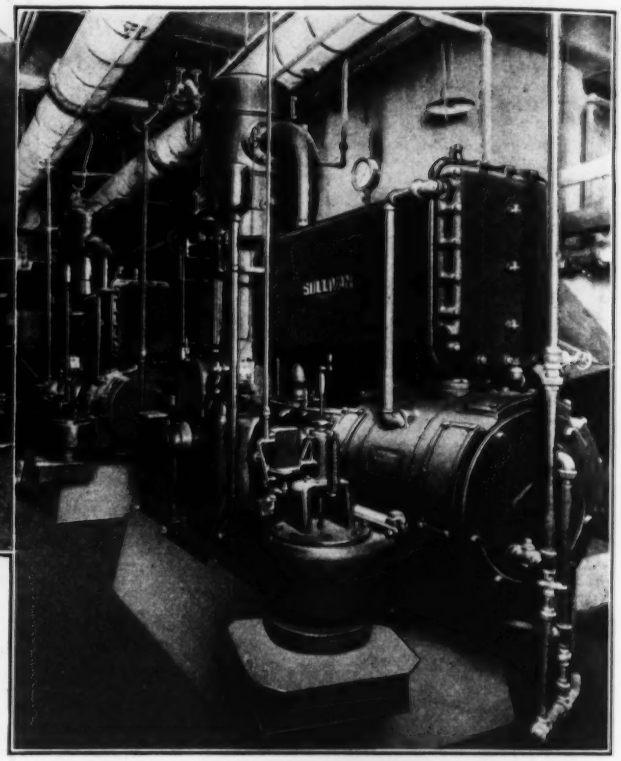
Raymond Concrete Pile Co., Ltd., Montreal, Canada

ATLANTA	CHICAGO	KANSAS CITY	PHILADELPHIA	ST. LOUIS
BALTIMORE	CLEVELAND	LOS ANGELES	PITTSBURGH	ST. PAUL
BOSTON	DETROIT	MIAMI	PORTLAND	WASHINGTON
BUFFALO	HOUSTON	MILWAUKEE	SAN FRANCISCO	LONDON, ENGLAND

Saves 5% Fuel *with* Air Power

obviously, in this plant which overlooks no economy—air power is supplied by ***Balanced Angle Compressors***





Scranton Electric Company's power station, on the Susquehanna River, 20 miles below Scranton, Pennsylvania.

At right: Two Sullivan Angle Compound Compressors belted to electric motors, on short centers, which supply air power to the plant.

BALANCED SULLIVAN ANGLE COMPOUND

Angle Compounds supply low cost air power to leaders in every industry

AIR soot blowers clean boilers every eight hours in the West Pittston power station—and save the Scranton Electric Company one ton of coal in twenty.

The leading designers who built the plant knew the economy of this thrice-daily cleaning. They installed an economical cleaning method, ten times faster than hand labor.

And they gave the station lowest cost air power for the work—by installing Balanced Angle Compressors.

Two Sullivan Balanced Angle Compressors supply 2600 cu. ft. of air per min., at 100 lbs. pressure. Twenty-five minutes are required for cleaning each of the six 1780 H. P. boilers, which operate continuously.

Do you know why leaders in every industry are turning to Balanced Angle Compressors? Let us tell you what air power for your plant will cost you.

Send for Catalog 83-J

SULLIVAN MACHINERY COMPANY
404 N. Michigan Ave., Chicago

Offices in principal cities all over the world

SULLIVAN TRADE MARK

Little Points of Refinement that *make* a *better* spiral

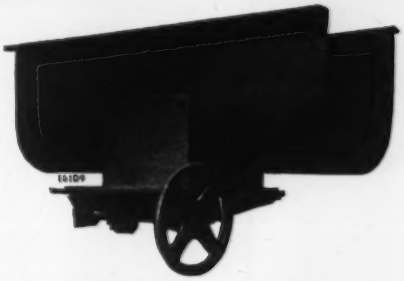
JEFFREY Spiral Flights, sectional and helicoid types, fit the pipe so closely that the end lugs receive very little strain in operation. The sectional end flights, where the most wear comes, are made extra heavy.

The steel troughs are practically rigid steel girders and require little support. They can be fitted with dust seal covers when desired.

Conveyors over twenty-five feet long in steel boxes have renewable thrust collars, two steel collars alternated with two bronze collars.

Both the plain and the rack-and-pinion type valves can be assembled so that the sliding plates operate in any one of four directions. The discharge spouts are welded to the trough. Being practically free from breakage, the steel plate construction of these spouts and valves represents a distinct improvement over the older cast iron types.

The Jeffrey Spiral Conveyor shown here is distributing coal over the bunkers in a power plant where conditions do not permit the use of a return conveyor. Catalog 398-G gives complete specifications for Jeffrey Spirals.



Rack and Pinion Valve

Plain Slide Valve

The Jeffrey Manufacturing Company
923-99 North Fourth Street, Columbus, Ohio

New York, Buffalo, Rochester, N. Y. — Philadelphia, Pittsburgh, Scranton, Pa. — Boston, Cincinnati, Cleveland — Detroit, Chicago, Charleston, W. Va. — Milwaukee, St. Louis, Denver — Salt Lake City, Atlanta, Birmingham — Houston, Utica

Jeffrey Mfg. Co., Ltd., of Canada, Head Office, Montreal; Branch Office, Toronto

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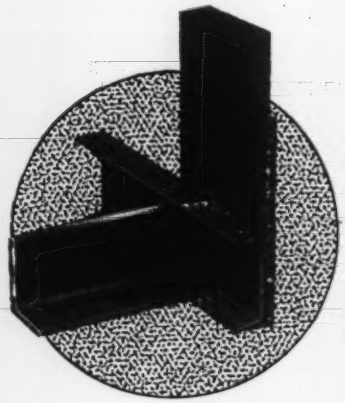
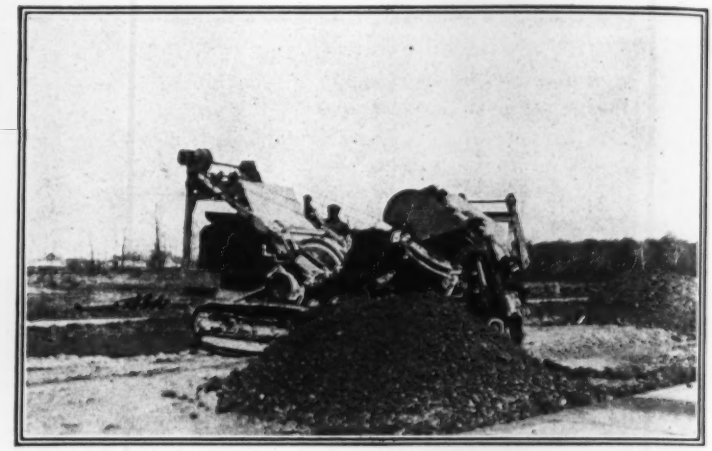
MATERIAL HANDLING EQUIPMENT

Jeffrey Products

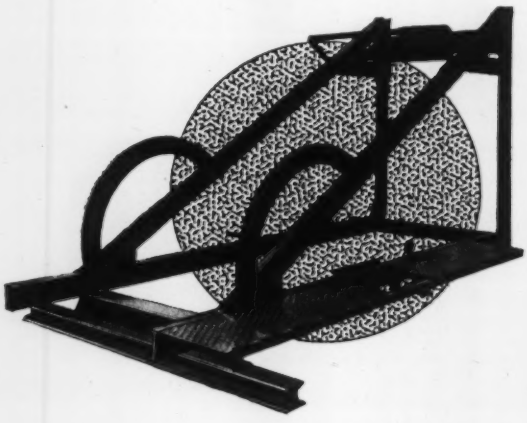
Elevators—Conveyors
Trolley Conveyors
Portable Loaders
Coal and Ashes Handling Equipment
Skip Hoists
Chains and Attachments
Sprocket Wheels—Gears
Crushers—Pulverizers
Sand and Gravel Handling, Washing and Screening Equipment
Locomotives
Mine Equipment
Ventilation Fans

Steadier Profits ~ ~ ~ With The Electrically Welded, Steel Frame Pony-Ditcher





These illustrations show the electrically welded main frame of The Pony-Ditcher and a close-up of one of the welded joints. Other parts that are electrically welded include the crawler frames, conveyor frame, and the excavator boom. This construction combines great strength with light weight and there are no rivets to work loose in service.



Several years ago when the first Pony-Ditcher was built, gangs of men digging ditches were a common sight. Even though bids are figured more closely today, the man who has a dependable ditcher and a good operator on it, can make larger profits than he could under the old system.

The Topping Pony-Ditcher with its welded steel frame, individually self-cleaning buckets, ball bearings on all high-speed shafts, and a dependable crawler mounting that will take it anywhere, is an outstanding buy among small ditchers. Its superior design and quality construction insure big output and a minimum of time out for repairs.

If you are interested in a machine that will put you in the running against competitive bidders and still enable you to make a good profit, just ask our nearby representative for full details on The Pony-Ditcher.

Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco, Cleveland.
Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

INDUSTRIAL BROWNHOIST

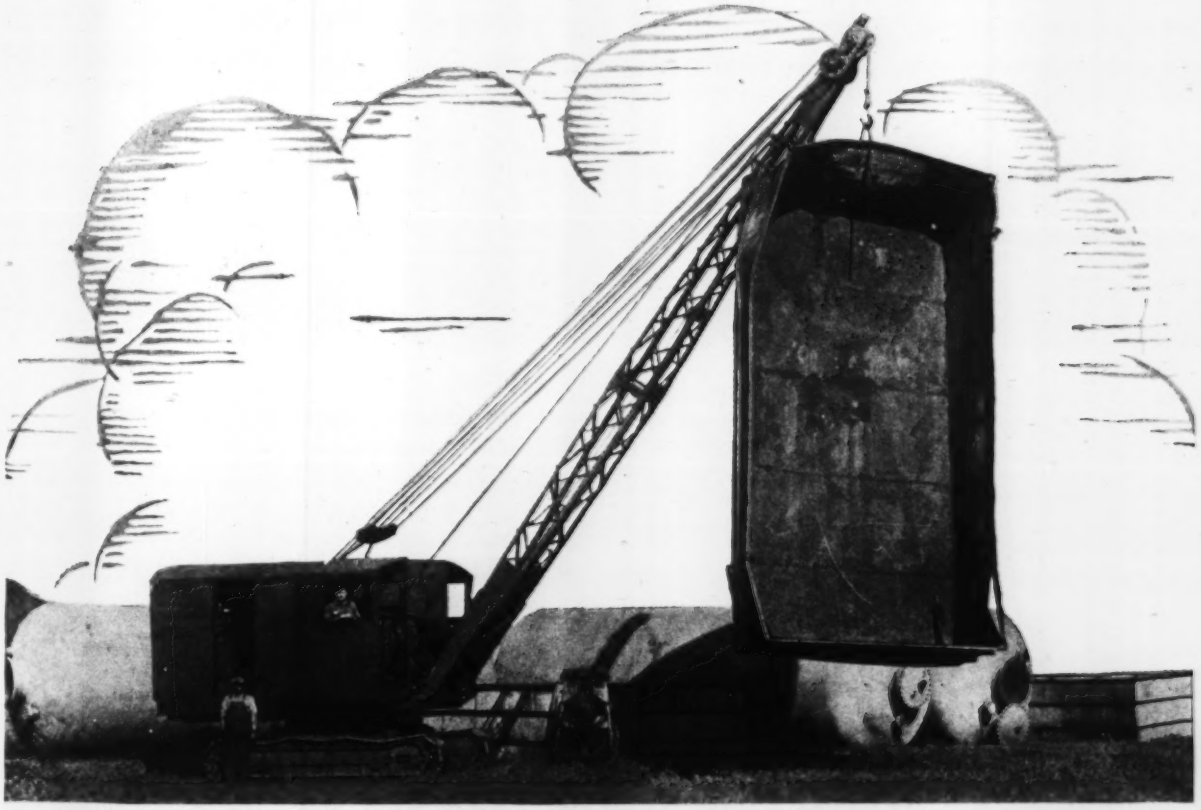
"No Better Example of Efficiency ~ ~

could be asked, and no hesitancy is felt in according this machine the highest praise, based on the very satisfactory results secured from continuous twenty-four hour service."

Satisfied customers are the back bone of any product's success, and this letter from an enthusiastic Industrial Brownhoist crane owner indicates the dependability these users have come to expect from their machines.

Fewer dollars will be spent for handling materials when you put an Industrial Brownhoist locomotive or crawler crane on the job. A saving of fifty per cent is not unusual, because one crane does the work of a big gang of men, and goes anywhere.

If you want to know how efficient a crane would be on your work, just get in touch with our nearby representative.



Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco, Cleveland.
Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

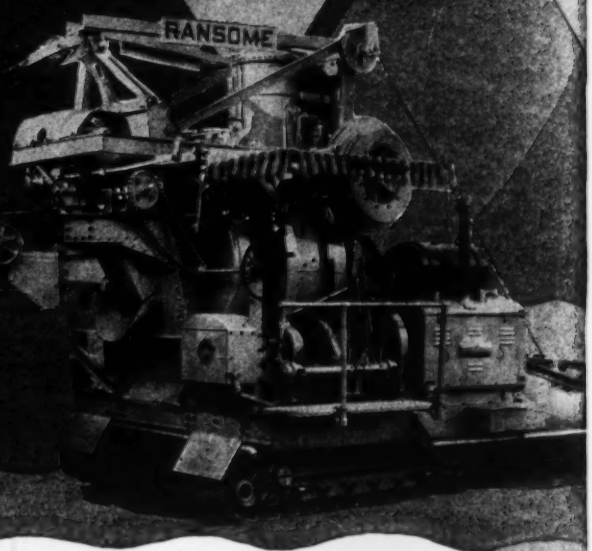
INDUSTRIAL BROWNHOIST

Ransome

VER

for Lo

Life



"Our Ransome Paver has already gone through five seasons of hard work with practically no shut-downs for repairs."

"I would estimate that it annually delivers over 11,000 cu. yds. of concrete. In its fourth year it delivered over 16,000 cu. yds. The travel estimate on its own power and crawlers is upwards of 25 miles annually."

"I feel justified in estimating it good at least for three more seasons' work."

FRANK B. BOSCH,
Central Construction Corporation,
Harrisburg, Pa.

The Master Paver Book tells the whole story about the Ransome 27-E Paver.

Send for your copy today.

PAVERS 27-E, 13-E, 10-E

Ransome Concrete Machinery Company

1853—Service for 76 Years—1929

Dunellen New Jersey

The

UNIVERSAL 35

is

The Only

½ Yd. Machine

with

"THEW CENTER DRIVE"

THE UNIVERSAL CRANE COMPANY

Lorain, Ohio

Center Drive Shovel Boom

Thew Center Drive applied to the Universal-35 shovel boom enables it to dig and swing higher than any other shovel equipped with same length of boom and stick.

UNIVERSAL

Motor Truck

CRANES

4 Speed Center Drive Crawler

Thew Center Drive applied to The Universal-35 crawler gives it 4 speeds under load drive, with a separate low speed for swinging and a high speed of 2 M. P. H. for road travel.

AN IMPORTANT FOUNDATION JOB

Broad St. Subway—Philadelphia

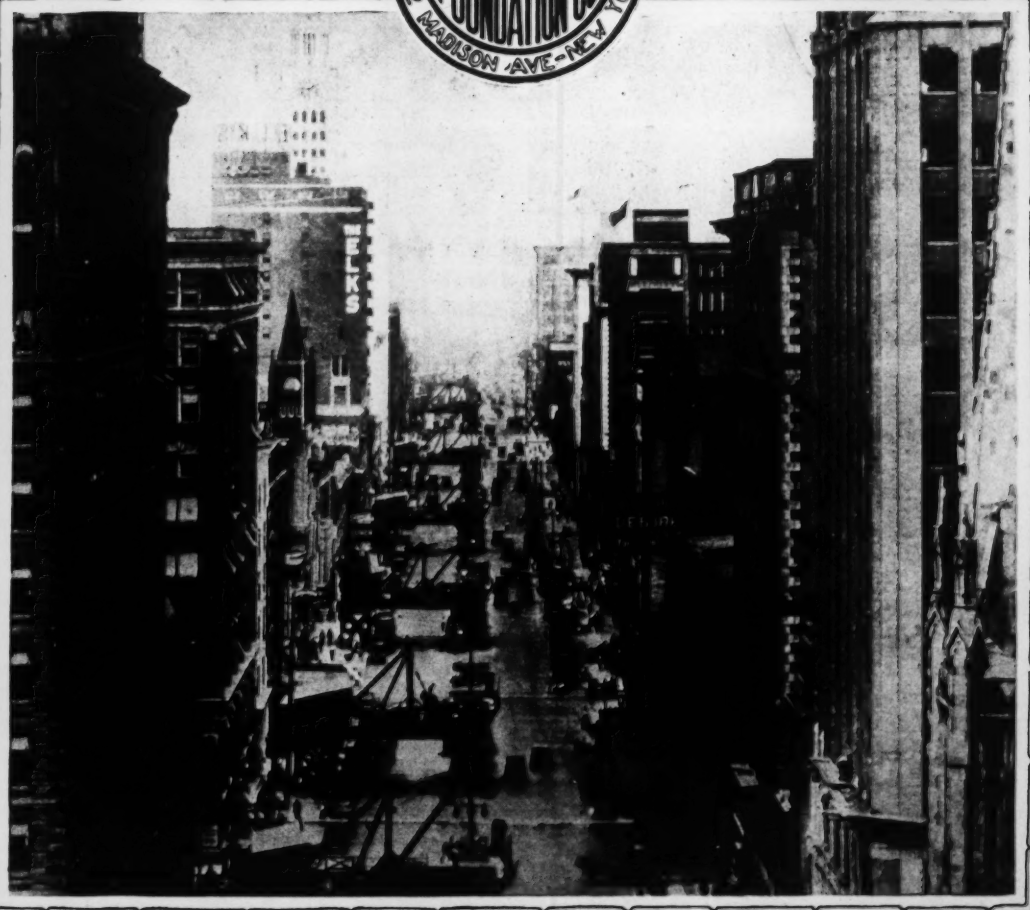
The construction of this subway called for the difficult task of underpinning buildings on both sides of the street. For a distance of nearly four miles most of these tall buildings now rest upon concrete foundations installed by this Company. The work was accomplished without difficulty or delay—another achievement added to the long list of similar undertakings; we have probably done more underpinning than any other concern in existence.

These sections of the Subway were built by the Keystone State Construction Company. The underpinning contractor was—

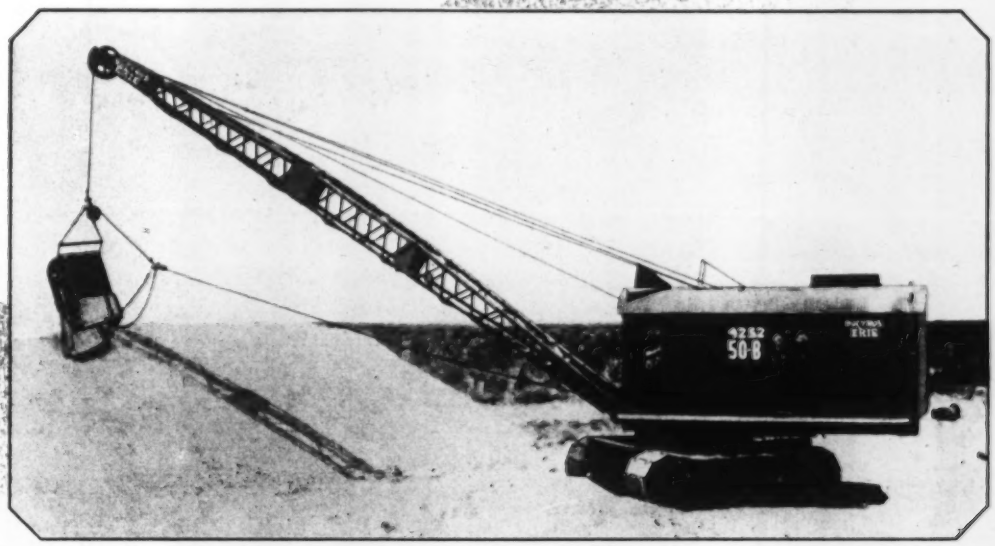
Foundation Construction of whatever nature Anywhere

UNDERPINNING & FOUNDATION CO., INC.
342 Madison Avenue
New York, N. Y.

CONSTRUCT-DESIGN-SUPERVISE
UNDERPINNING AND FOUNDATION CO
342 MADISON AVE-NEW YORK



Chosen for the world's large drainage and irrigation projects—



—because of lower unit costs and unequalled Reliability!

In India's Desert of Sind, on the Mexican Government's Irrigation Projects, across the Salonika Plains of Greece, in Egypt on the Sudan Irrigation, on the large drainage and irrigation works in the United States—machines are purchased after a careful investigation and analysis of merit. And *lowest unit costs and continuous operation are the two essential requirements!*

That is why, on these large projects, there are more BUCYRUS-ERIE draglines than all other makes combined.

Maximum production has figured largely in the records for lowest unit costs made by BUCYRUS-ERIES on these operations—achieved not only by faster performance but by the reduction of lost time, and lost output.

Through nearly half a century of continuous development BUCYRUS-ERIE has perfected rugged, sturdy machines, simple and with easily accessible machinery, built with parts of specially adapted steels. Tested and proved in world-wide service, these machines have achieved an outstanding reputation for reliability. They "stand the gaff" and give continuous production under the most gruelling conditions.

Your job, too, needs these profit-making characteristics of BUCYRUS-ERIES. Take advantage of investigations made and experience gained on these gigantic earth-moving projects. Look over the specifications of a BUCYRUS-ERIE of suitable size. Drop us a line telling what you need!

On these projects BUCYRUS-ERIE Diesels show exceptionally low unit costs—in part because of their remarkable fuel economy. In some cases the two-yard 50-B—a very popular size for this work—has averaged less than two dollars per shift for fuel oil. Remember that BUCYRUS-ERIE Diesels use only ⅓ to ¼ as much fuel as gasoline machines of the same size and that the fuel costs only ⅓ to ¼ as much per gallon. That means a net saving to you of 75 per cent and over on the fuel bill!

BUCYRUS-ERIE COMPANY

Plants: South Milwaukee, Wis., Erie, Pa., Evansville, Ind.

General Offices: South Milwaukee, Wis.

Representatives and Service throughout the U. S. and Canada
Offices and Distributors in all principal countries of the world

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Boston	Birmingham	Chicago
New York	Pittsburgh	St. Louis
Philadelphia	Buffalo	Dallas
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BUCYRUS ERIE

Adv. 782

—for underwater driving in the Atlantic Ocean

The James Ferry Co., Inc. of Atlantic City,

recently completed the sub-structure for the new Casino Building at Asbury Park, N. J., approximately 1,300 wood piles driven under 15 feet of water. Used two 9-B2 hammers.

It was necessary to use steel sheet piling around the columns that support the deck over the ocean and they drove this piling with one of our No. 6 hammers. This hammer, with inverted attachment, was also used to pull the sheet piles.

Also used these hammers to tap approximately 2,400 temporary piles used as false work for the deck slab. Were well pleased with all the work done by our hammers on this job.

Apply these commendations to the work of McKiernan-Terry Hammers all over the world and you have our whole story! Catalog?

SUCCESSFUL PERFORMANCE A.G.C.-A.E.C.

McKIERNAN-TERRY DRILL COMPANY, 13 Park Row, New York

Pile Hammers and Accessories, Drilling Machinery

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J. W. BARTHOLOW CO.
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THE BRITISH STEEL PILING CO., LTD.
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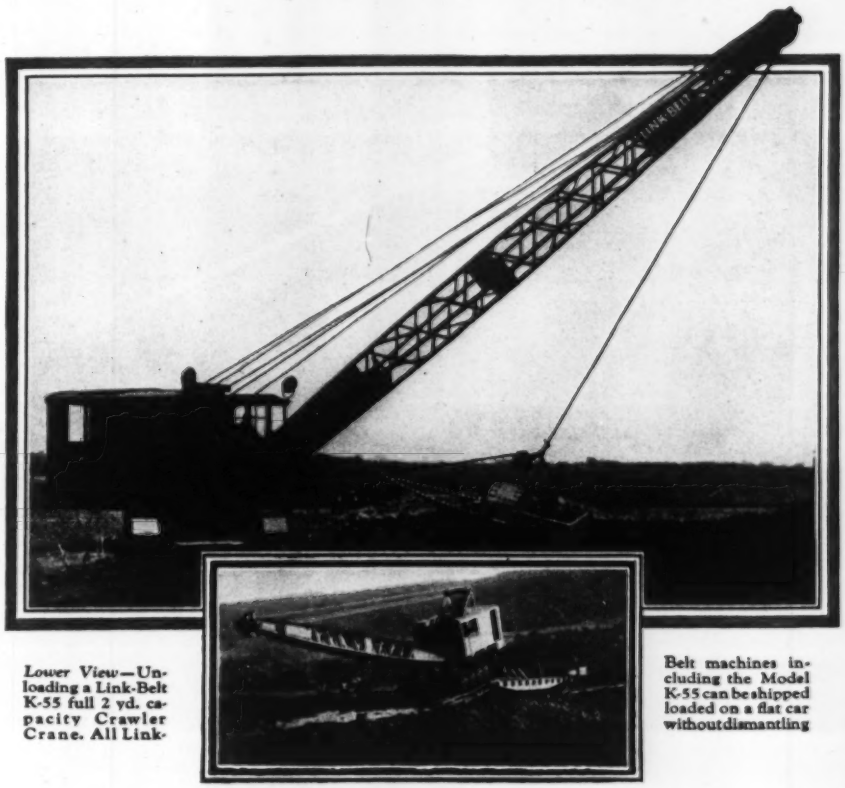
DRIVE

McKIERNAN-TERRY

The Pioneer Double-Acting Hammers

PULL

Again—Unhesitating Approval



Lower View—Unloading a Link-Belt K-55 full 2 yd. capacity Crawler Crane. All Link-Belt machines including the Model K-55 can be shipped loaded on a flat car without dismantling

Here's another typical user opinion of the Link-Belt Shovel—Crane—Dragline. W. S. Montgomery, General Manager, Stoney Creek Sand and Gravel Co., Elizabeth City, N. C., wrote a Pittsburgh concern saying—

"I am using a Link-Belt gasoline crawler in a gravel pit and can unhesitatingly say that it is one of the most satisfactory excavating units I have ever seen.

"My repairs on said machine have been very little, having had no trouble in the way of breakdowns. The Link-Belt shovel will do all and a little more than the Link-Belt Company says it will do."

Link-Belt Shovels—Cranes—Draglines are built to DIG, not to "sell." There's not another shovel on the market that will do more digging per dollar.

Built in sizes up to and including full 2 yd. capacity, heavy duty units.

Send for *new* 50 page Book No. 1095, just off the press.

LINK-BELT COMPANY

Builders of Locomotive Cranes for 30 years. Portable Loaders—Crawler Cranes—Shovels—Draglines

CHICAGO, 300 W. Pershing Road

Offices in Principal Cities

9738

LINK-BELT

SHOVELS + CRANES + DRAGLINES

75 Leading Publishers Use BLOXONEND Flooring

FLOORS play a major role in the publishing of a newspaper. Absolute SMOOTHNESS is essential to expedite trucking and to prevent the pieing of forms; QUIETNESS and RESILIENCE are important for the comfort of employees; UTMOST DURABILITY is necessary to withstand the gruelling abuse a floor gets 365 days a year.

That BLOXONEND meets these requirements is evidenced by the fact that 75 of America's leading newspapers have installed it. In addition to Hearst, users include Cleveland News, New York Telegram, Chicago Daily News, Philadelphia Record and Kansas City Star.

Hundreds of the greatest industrials in America have also adopted Bloxonend as standard heavy duty flooring. *Write for sample and descriptive Booklet.*

CARTER BLOXONEND FLOORING COMPANY
Kansas City, Mo.
Branch offices in leading cities

Bloxonend Flooring installed throughout Mechanical Departments of new home for Hearst's New York American and Evening Journal. Geo. Pancoast, Engineer, C. E. Birge, Architect.

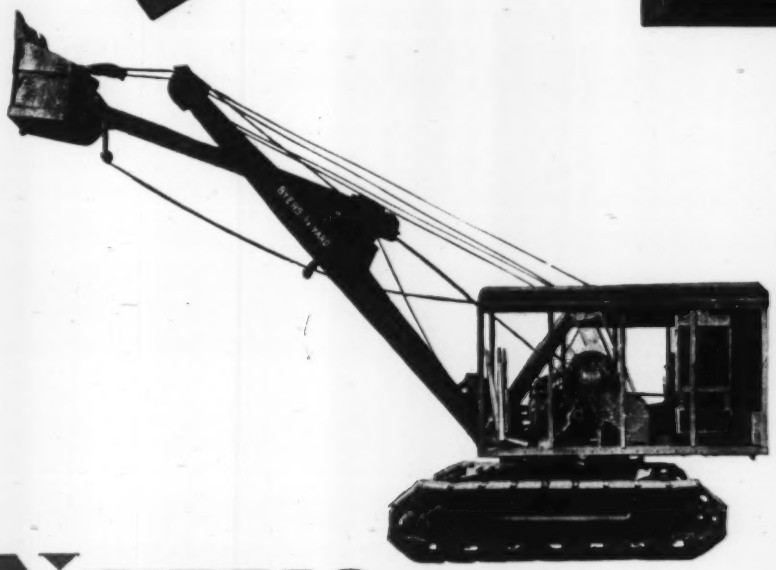
Bloxonend comes in 8 ft. lengths. The tough endgrain forms the wearing surface.

BLOX-ON-END FLOORING

Lay's Smooth
Stay's Smooth

ANNOUNCING

BYERS ¾ yd.



SHOVEL
CRANE
DRAGLINE
TRENCHER
SKIMMER

NEW? *Yes-and No!*

A NEW SIZE? *Yes.*

A NEW DESIGN? *No,* because the same famous Byers design and construction details are built into the ¾ yd. that have been proved in Byers 1¼ yd. Master and ½ yd. Bulldog.

The ¾ yd. is new in size but old and established in principle. A typical Byers Quality product. Tested and proved!

The price is directly in line with other ¾ yd. rigs, but the capacity, speed, power, flexibility and ease of handling is way ahead—it has the famous Byers independent reversible crowd and cable shock absorbers. Steer with cab in any position, chock machine from cab, not from ground, heavily reinforced wood filled boom and many other advantages.

Get acquainted with the ¾ yd. modern features in Byers brand new catalog. It's yours for the asking.

IT'S *the BYERS* CROWD *that DOES* IT

BYERS PRODUCTS

Byers 1 1/4 yd. Master
Shovel, Crane, Dragline

Byers 3/4 yd.
Shovel, Crane, Dragline, Trencher, Skimmer

Byers 1/2 yd. Bulldog
Shovel, Crane, Dragline, Trencher, Skimmer

Byers 1/2 yd. Half Circle Bear Cat
Shovel, Crane, Dragline, Trencher, Skimmer

THE BYERS MACHINE COMPANY
RAVENNA, OHIO
SALES AND SERVICE THROUGHOUT THE COUNTRY

BYERS

A new kind of ROOFDECK

"Laid like boards"

...made of rust-resisting ARMCO Ingot Iron *for long, low-cost service*

NOW your roofing installations can be what you've long desired. ROOFDECK of rust-resisting ARMCO Ingot Iron is the answer.

This pure iron decking is light in weight, waterproof, fireproof, and strong. The deck sections are easily and quickly installed, interlocking tightly, and forming rigid reinforcing ribs and a smooth, continuous surface. Then the insulation is applied and next the waterproofing material—resulting in a strong, impervious roof.

Engineers and plant owners will find this ARMCO Ingot Iron roofing deck economical, both in ease-of-installation and low-maintenance cost.

Two leading companies make this new ARMCO Ingot Iron roofdeck—the Genfire Steel Company, (Rigideck) and the Truscon Steel Company, (Ferrobord) both of Youngstown, Ohio. Write them direct. Or, if you prefer, we shall be glad to see that you get complete information.

Here you see a cross-section view of this new roofdeck, with insulation and built-up waterproofing applied. The sections are furnished in either 18 or 20 gage ARMCO Ingot Iron with 1¼" and 1¾" depth of ribs and in lengths up to 30'.

THE AMERICAN ROLLING MILL COMPANY
Executive Offices, Middletown, Ohio

Export: The ARMCO International Corporation
Cable Address—ARMCO, Middletown (O.)

District Offices:

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ARMCO
INGOT IRON
RESISTS RUST

8 INCH CENTER PIN

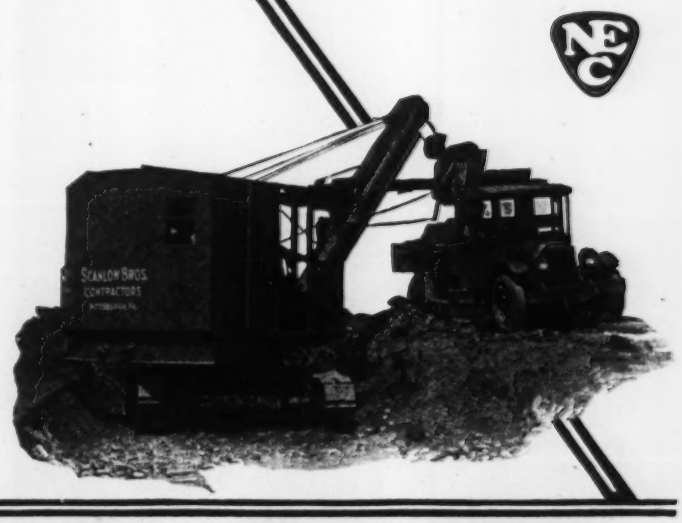
THE Insley Type R has an eight-inch center pin. Think of it—a half-yard machine with an eight-inch center pin. Compare the center pin of the Insley with that of any other half-yard machine and you will find that the Insley center pin is the largest in its class. Carry the comparison further and you will find that very few three-quarter-yard machines have a center pin as large as the Insley.

Of course, the center pin is not the whole shovel, but it is a very vital part which is subjected to heavy stresses, and it is an example of the heavy and rugged construction of the Insley.

This is only one of many mechanical features in which the Insley excels, only one indication of the quality which is built into it, and only one of many reasons why it is the outstanding value in the half-yard class.

Division of National Equipment Corporation

725

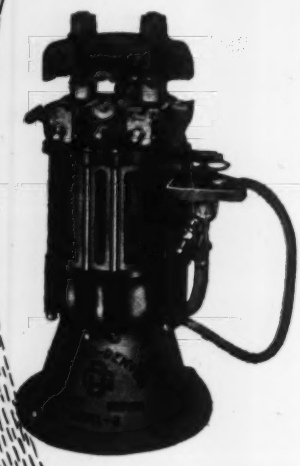


INSLEY

MANUFACTURING COMPANY — INDIANAPOLIS

ENGINEERS AND MANUFACTURERS

Speed up production with GD products



Model DS-3A

Model DS-3A Drill Sharpener is the fastest yet developed, has great clamping power and will make bits up to 2½ inches.

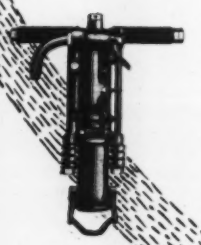
Model 11 Waughammer is a light weight hammer drill. It is fast, powerful, easy riding and assures deep, clean holes.

The Gardner-Denver Derrick is used to mount drills for deep down holes. Long steels can be easily lowered and withdrawn when the Derrick is employed.

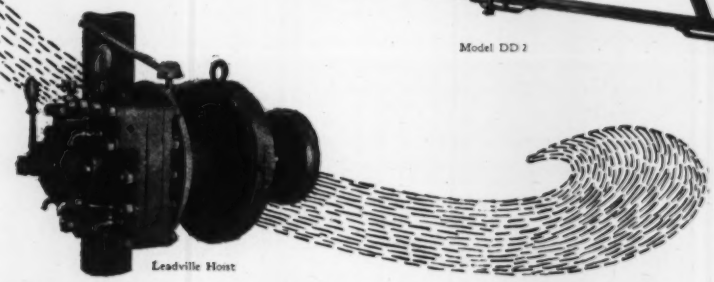
The Leadville Air Hoist is a favorite among metal and coal miners and is now being adapted to "pulling jobs" on construction work by mounting it on the frames of portable air compressors.

A catalog describing these four units and illustrating the complete Gardner-Denver line of products mailed you on request.

Model DD 2



Model 11



Leadville Hoist

GARDNER-DENVER COMPANY

QUINCY, ILL. DENVER, COLO.

Branches in All Principal Cities

GARDNER-DENVER

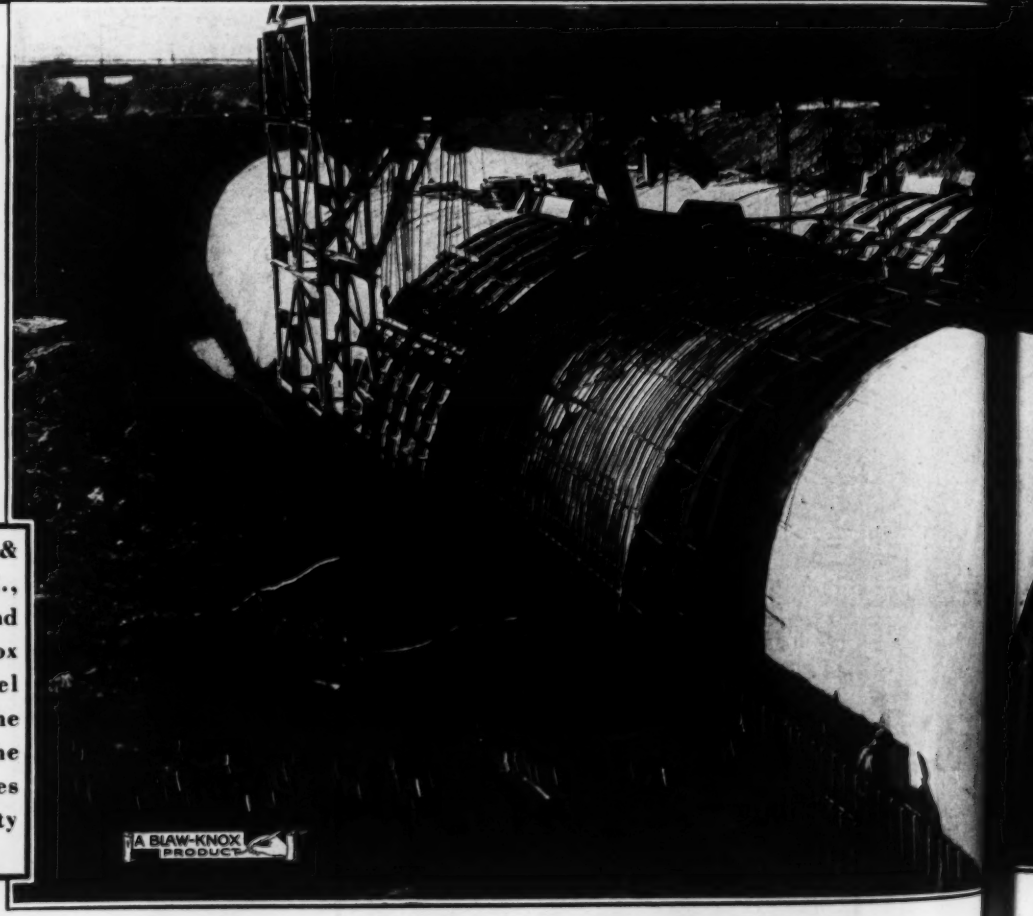
—That's why NORTHWEST is the world's largest exclusive builders of gasoline and electric powered shovels, cranes, draglines, pull-shovels and skimmer scoops

ENR6-27Gray

NORTHWEST

W. E. CALLAHAN CONSTRUCTION CO., are using Blaw-Knox Telescopic Steel Sewer Forms on the 32 ft. section of the River des Peres Drain for the City of St. Louis.

Ready Mixed Concrete, produced at a Blaw-Knox Central Mixing Plant, is hauled to the job and dumped from the trucks directly into the forms.



A. GUTHRIE & COMPANY, INC., are using inside and outside Blaw-Knox Telescopic Steel Sewer Forms on the 29 ft. section of the River des Peres Drain for the City of St. Louis, Mo.

Steel Forms by BLAW-KNOX

insure that St. Louis Sewers will be built economically and that the schedule of construction will run like a clock.

Where Blaw-Knox enters—*form grief* stays away from the job.

Blaw-Knox points with pride to twenty-three years of experience and engineering accomplishment in making thousands of concrete jobs economically possible.

Your work, large or small, can probably benefit by Blaw-Knox STEEL FORM engineering advice—*free for the asking.*

BLAW-KNOX COMPANY

601 Farmers Bank Bldg., Pittsburgh, Pa.

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Buffalo	Detroit	Baltimore
Birmingham	Cleveland	Philadelphia
	Boston	

Export Division:
Milliken Bros.—Blaw Knox Corp.,
Canadian Pacific Building
New York, N. Y.

TRADE MARK REG. U.S. PAT. OFFICE BLAW-KNOX

INUNDATION

in another corner of the world

The demand for
—quality concrete
—workable concrete
—economical concrete
—CONSTANT CONCRETE
spreads to

Uruguay

The Blaw-Knox INUNDATION SYSTEM is a complete proportioning machine, controlling water-cement ratio, accurately proportioning aggregates and compensating for the bulking action of moist (job) sand. Cement weighing system also furnished when desired.

Completely described in Bulletin No. 996—a copy of which will be sent upon request.

In the selection of the Blaw-Knox INUNDATION SYSTEM, and a Blaw-Knox Central Mixing Plant, the engineers of the Empesa Constructora Castenalle, Montevideo, Uruguay, reflect and justify the opinions of engineers and contractors throughout *the world* who have used INUNDATION on thousands of concreting jobs.

BLAW-KNOX COMPANY
601 Farmers Bank Bldg. Pittsburgh, Pa.

New York: 342 Madison Avenue Buffalo: Genesee Building
Birmingham: Brown-Marx Bldg. Detroit: Lincoln Building
Cleveland: 526 Union Building Chicago: Peoples Gas Bldg.
Baltimore: Bayard & Warner Sts. Boston: 605 Statler Building
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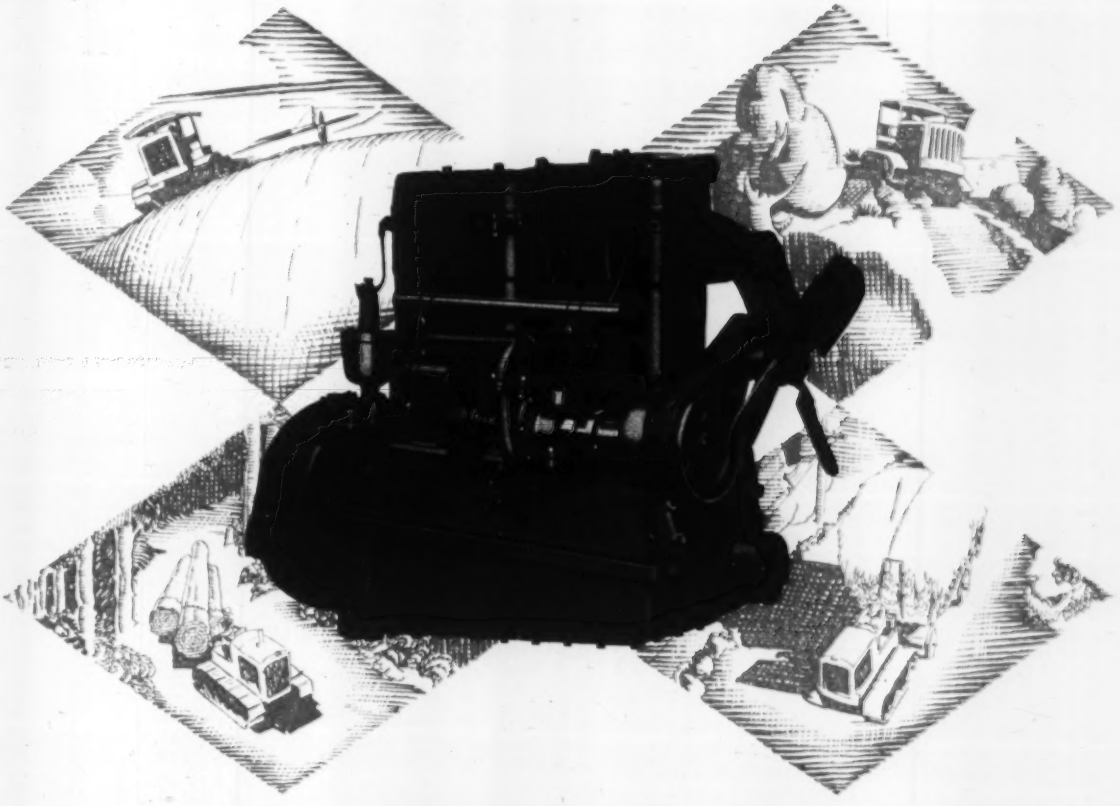
BLAW-KNOX

BLAW-KNOX

LE ROI

For Dependable Power



Why Le Roi Has Wide Acceptance

1

Le Roi Engines cost less to operate and maintain.

2

Le Roi Engines have "oversized" parts for greater power.

3

Le Roi Engines have a foolproof system of lubrication.

4

Le Roi Engines stay "active" longer.

5

Le Roi Engines are built by experienced and successful Engine Builders.

THE Le Roi Model "JA" is rugged . . . dependable . . . powerful. From every standpoint, the ideal heavy-duty engine. It is of the valve-in-head design, which gets the maximum power out of every explosion. "Oversized" working parts and vibrationless operation, and a fool-proof lubrication system assure dependable service over a long period of time. ***Write for special bulletin.***

LE ROI COMPANY, ***Milwaukee, Wis.***

LE ROI ENGINES

3 *to* 170 HORSE POWER

AND NOW
A
MARION
DIESEL-ELECTRIC

TIDEWATER Timber Co. of Portland, Oregon, finds in this new shovel all the economy of the Diesel with the fine operating characteristics of the steamer. Ask for full details.

THE MARION STEAM SHOVEL CO.
MARION, OHIO, U. S. A.

MARION

29032

Get "Concrete Facts"

YOUR COPY IS READY!

Pre-mixed concrete, conforming to the modern cement-water ratio, is rapidly replacing the old method of mixing on the job.

The modern system for mixing and delivering specification concrete is described and illustrated in our new booklet—"CONCRETE FACTS."

Mail us the coupon below and we will send you this booklet without cost or obligation.

TRANSIT SYSTEM
MIXED CONCRETE
THE PRODUCT OF

PARIS TRANSIT MIXERS

—is positive assurance of quality concrete construction on every job and meets every test for strength, durability and uniformity.

TRANSIT System Mixed Concrete is nationally advertised and is rapidly becoming nationally available. Construction experts specify this quality concrete by name because it conforms to all concrete requirements and is obtainable in any quantity. TRANSIT System Operators are now supplying TRANSIT System Mixed Concrete in a number of the principal cities throughout the country.

Desirable operator's franchises are available in some sections. If you desire more detailed information—write or telegraph—

TRANSIT MIXERS, Inc.

Call Bldg., San Francisco

Transit Mixers (Canada), Ltd., Bekins Bldg., Vancouver, B. C.

Mail this coupon today

TRANSIT MIXERS, INC.
Call Building, San Francisco.
Please send your free booklet, "CONCRETE FACTS."

Name .....
Address .....
City ..... State .....
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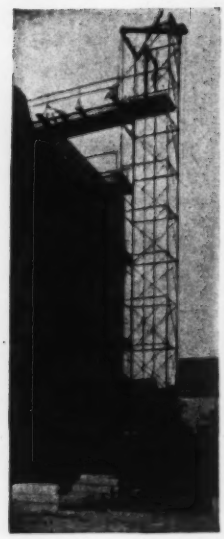
LAKEWOOD CONSTRUCTION EQUIPMENT

One Tower *does the work of* Two



CAGE inside—the concrete bucket outside—both independently operated—no moving of bucket on and off the cage—mixer placed to one side where it's out of the way—are the new advantages with Lakewood Material Towers.

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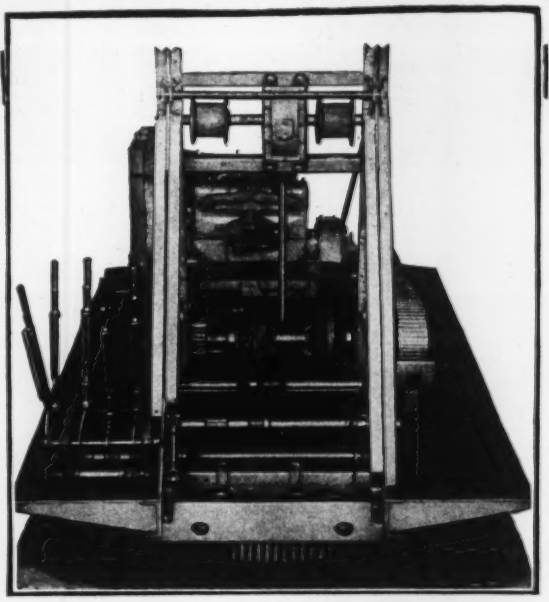
Then judge The MOORE SPEEDCRANE for yourself



AUTOMOTIVE TYPE ACCELERATOR CONTROL provides variable speeds and variable power with motor-car flexibility. Conveniently located for operator. Operates through motor governor, thus giving steam flexibility to gasoline motor. Standard equipment on the Moore Speedcrane "Made in Manitowoc," since 1926.

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THE HERCULES MOTOR model TXO, 6⅜x7, with extra heavy flywheel and power take-off, delivers over 100 h. p. full load operating speed. By the use of this low speed, powerful engine, life is prolonged, as Speedcranes do not obtain their remarkable operating speed thru increased engine speed. Simplified, automotive construction of the Moore Speedcrane fully utilizes all available power. Electric starting equipment is standard on all motors.

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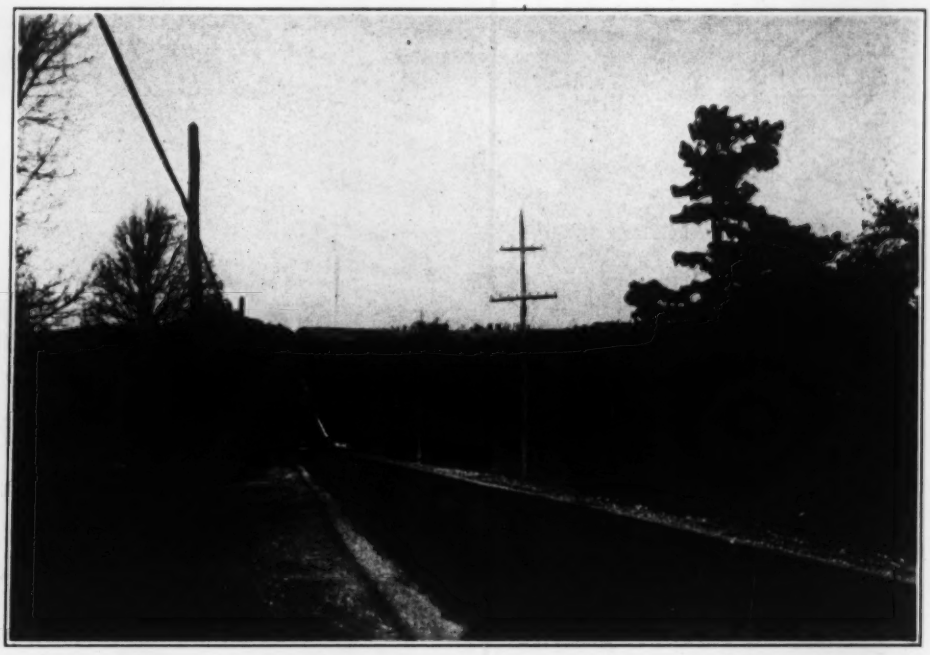

Massachusetts State Highway, Boston to Newburyport. Asphalt Macadam construction with SOCONY Asphalt Binder in 1923. This view taken in October, 1928, after the road had carried heavy traffic for five years without repairs or resurfacing.

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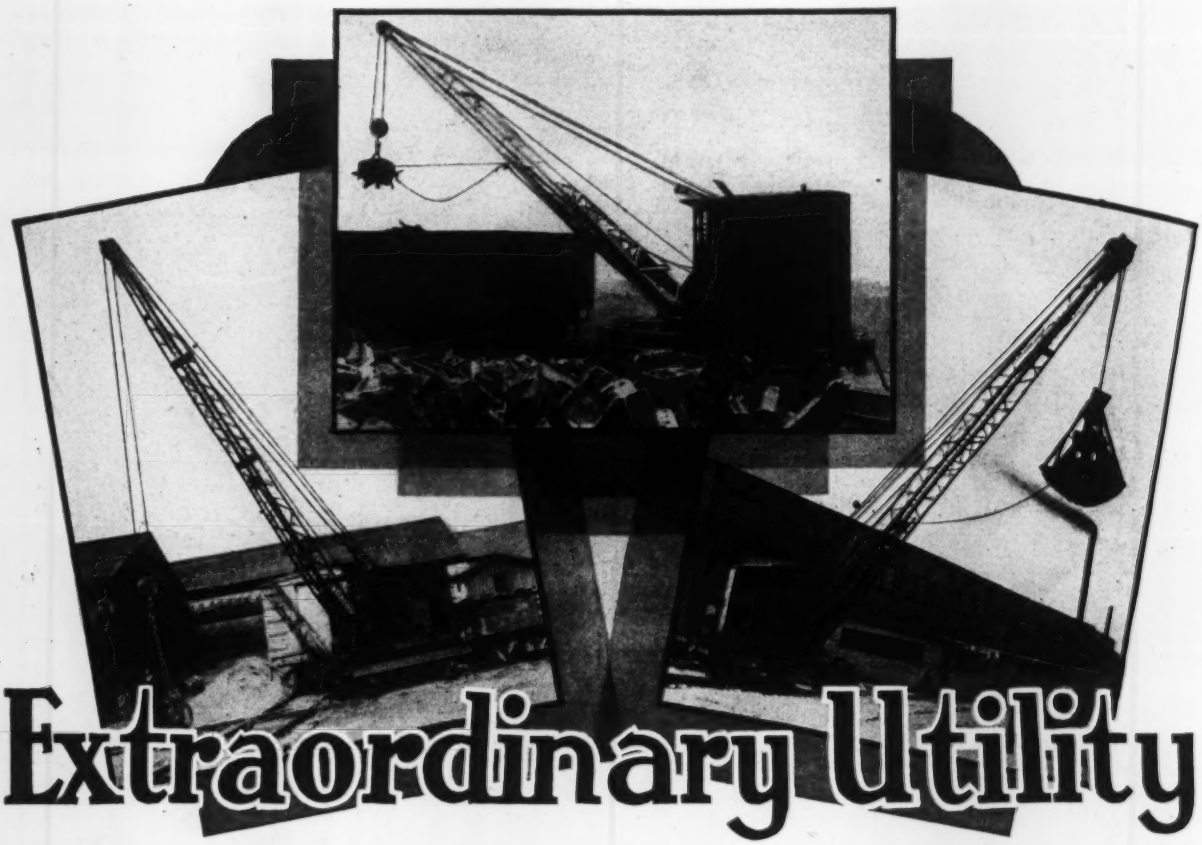

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Travels 20 Miles an Hour
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Eight traveling speeds, ranging from 1½ to 20 miles an hour.

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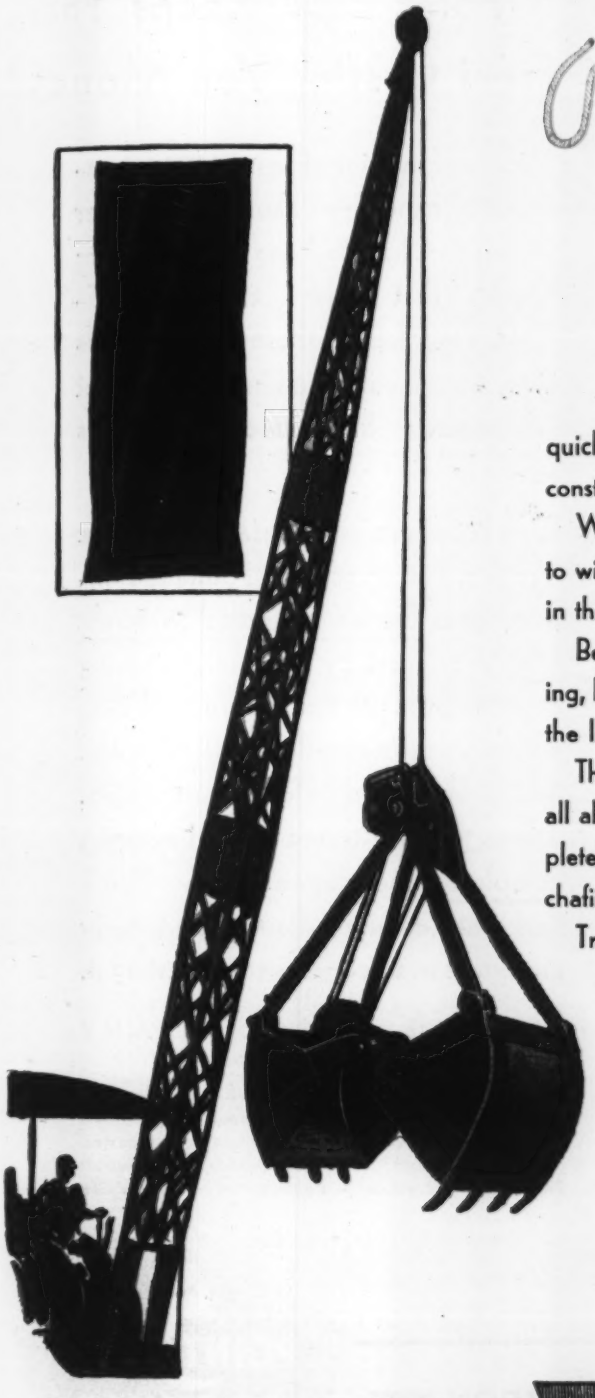

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THE small sheaves on clam shell buckets quickly chew up closing lines of regular wire rope construction.

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HAZARD ARMORED WIRE ROPE—(GORE PATENT) for use on operations where the service is particularly severe—such as Steam Shovels, Dredges, etc.

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Type H regular Mitco Armorgrids reinforcing a concrete floor in the basement of a prominent club in New York. Note the absence of cracks or wear, despite the abrasion to which the structure has been subjected for more than two years.

Shock-Proof Backbone With MITCO ARMORGRIDS

IN FLOORS, platforms, driveways and other structures poured of concrete, cement, mastic or composition, Mitco Armorgrids give battleship armor strength and shock-proof backbone. They prevent the development of cracks, retard wear and prolong the life of the structure.

Mitco Armorgrids produce a structure composed of series of small, rectangular blocks, surrounded by steel bars of high strength and rigidity. Cracks cannot pass from one rectangle to another. The weakness of the monolithic structure incident to ordinary floors, platforms and driveways is eliminated. In Mitco Armorgrids, there are no bolted, riveted or welded joints to prevent the smooth flow of the fill into the corners of the openings.

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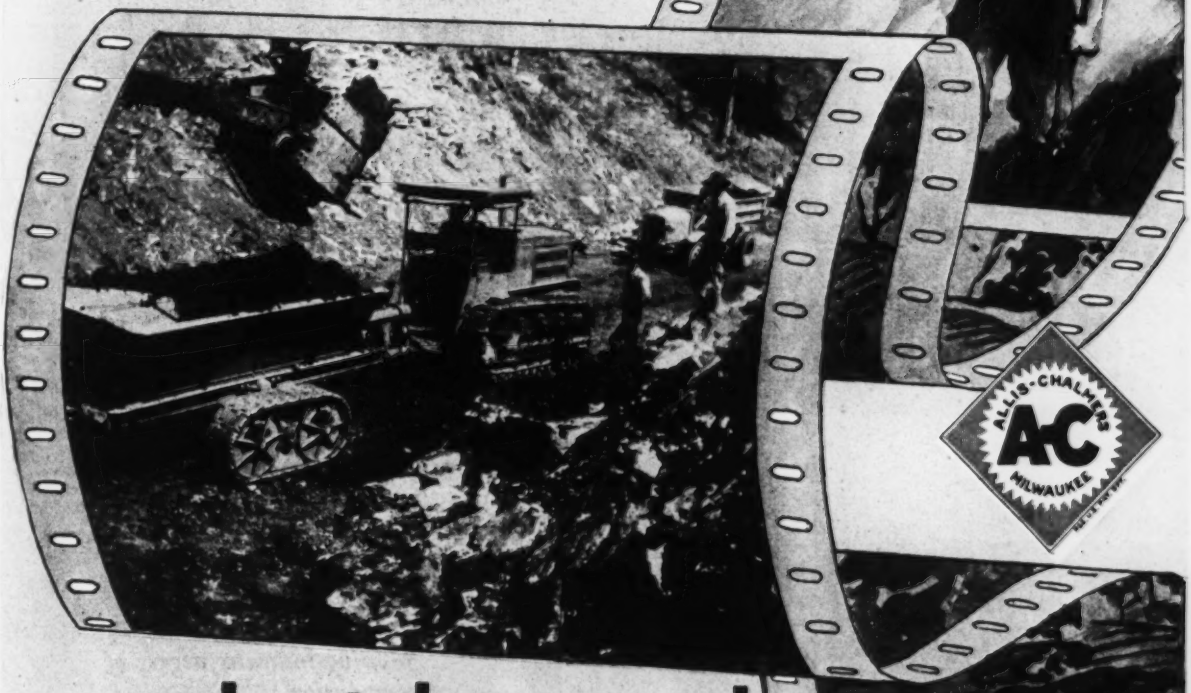
MITCO ARMORGRIDS

for longer life from concrete and cement floors, platforms and driveways

"Fill'er up! —the Monarch'll snake'er out"



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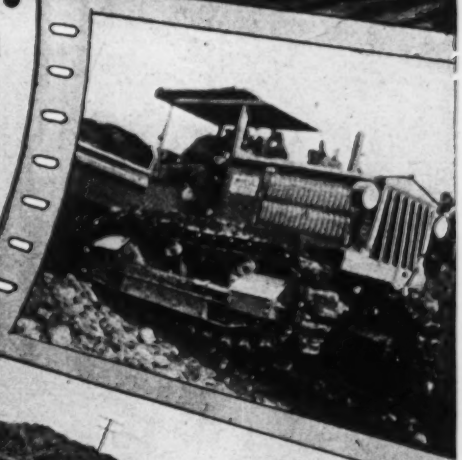
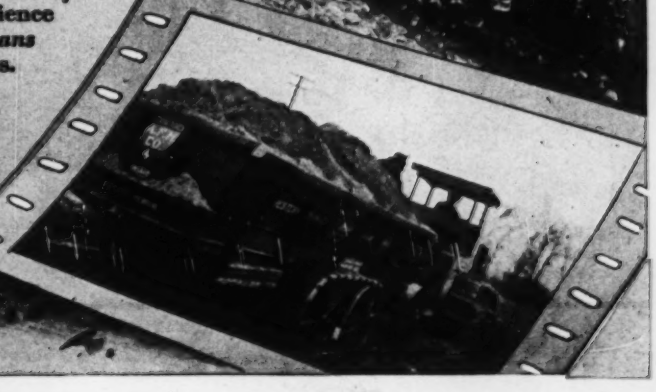
When a Monarch-operating contractor tells the shovel man to fill an 8-yard crawler wagon, he *knows* the Allis-Chalmers-Monarch will pull it *anywhere!*

Heavy loads and soft footing mean nothing to the Monarch, on any contractor's job. The Monarch scrambles over big rocks, ploughs through deep mud and dust, eases itself up high banks and into deep fills with as little effort as a duck paddling around on a pond. Hook on any load—you can't stump Monarch strength and power!

Contractors should investigate all the distinctive features of the Allis-Chalmers-Monarch. It is built by an organization that has over 80 years' experience in building power machinery—*and that means something!* Write for literature and prices.





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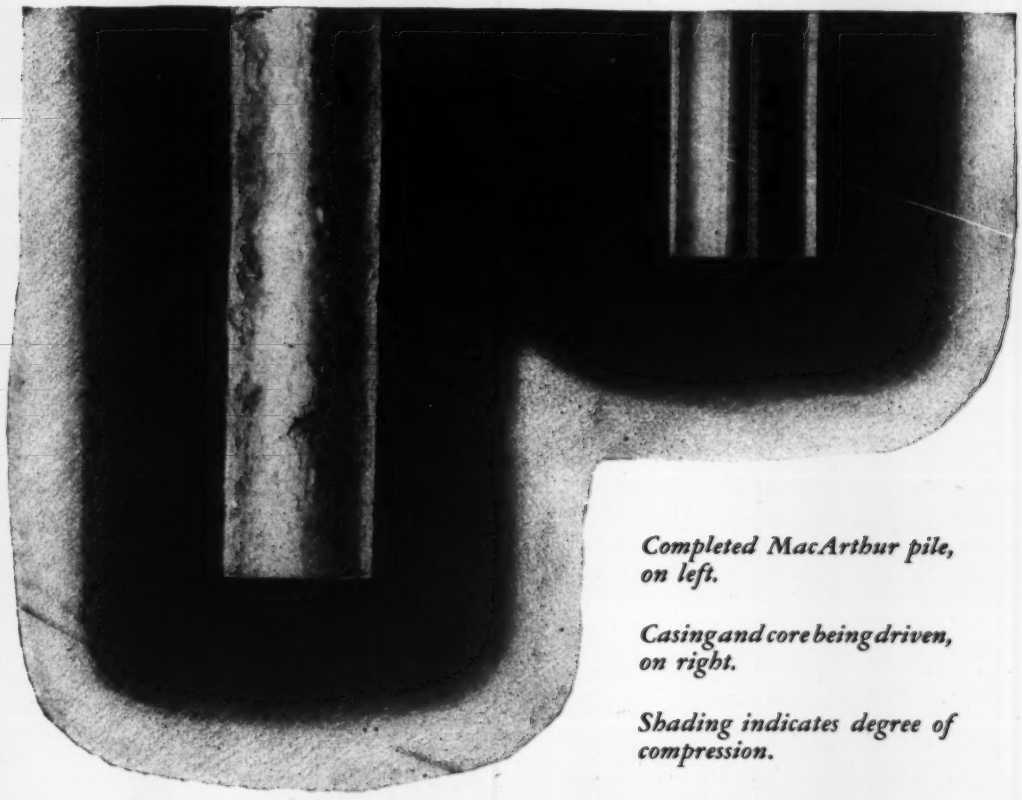

Completed MacArthur pile, on left.

Casing and core being driven, on right.

Shading indicates degree of compression.

insures perfect concrete piles on close centers!

The "dry" concrete (just sufficient water to bond) in the completed pile, was compressed under a weight of seven tons while the casing was being withdrawn. Obviously, no back pressure ever equals that force. Also, the compression adds to the skin-friction created by the driving of the steel core and half-inch thick steel casing.

The soil being displaced by the pile in process of being driven will follow the line of least resistance, which is *away* from the highly compacted finished pile and the earth surrounding it, which is also compacted by the compression of the concrete.

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Driving every type of pile, architects and engineers have found that our advice is unbiased. May we serve you?

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Product . .	*proven*	**Resources** .	*unlimited*	**Performance** .	*100%*
Experience .	*19 years*	**Personnel** .	*capable*	**Engineering** .	*sound*
Equipment .	*latest*	**Clientele** .	*illustrious*	**Speed** .	*record-making*
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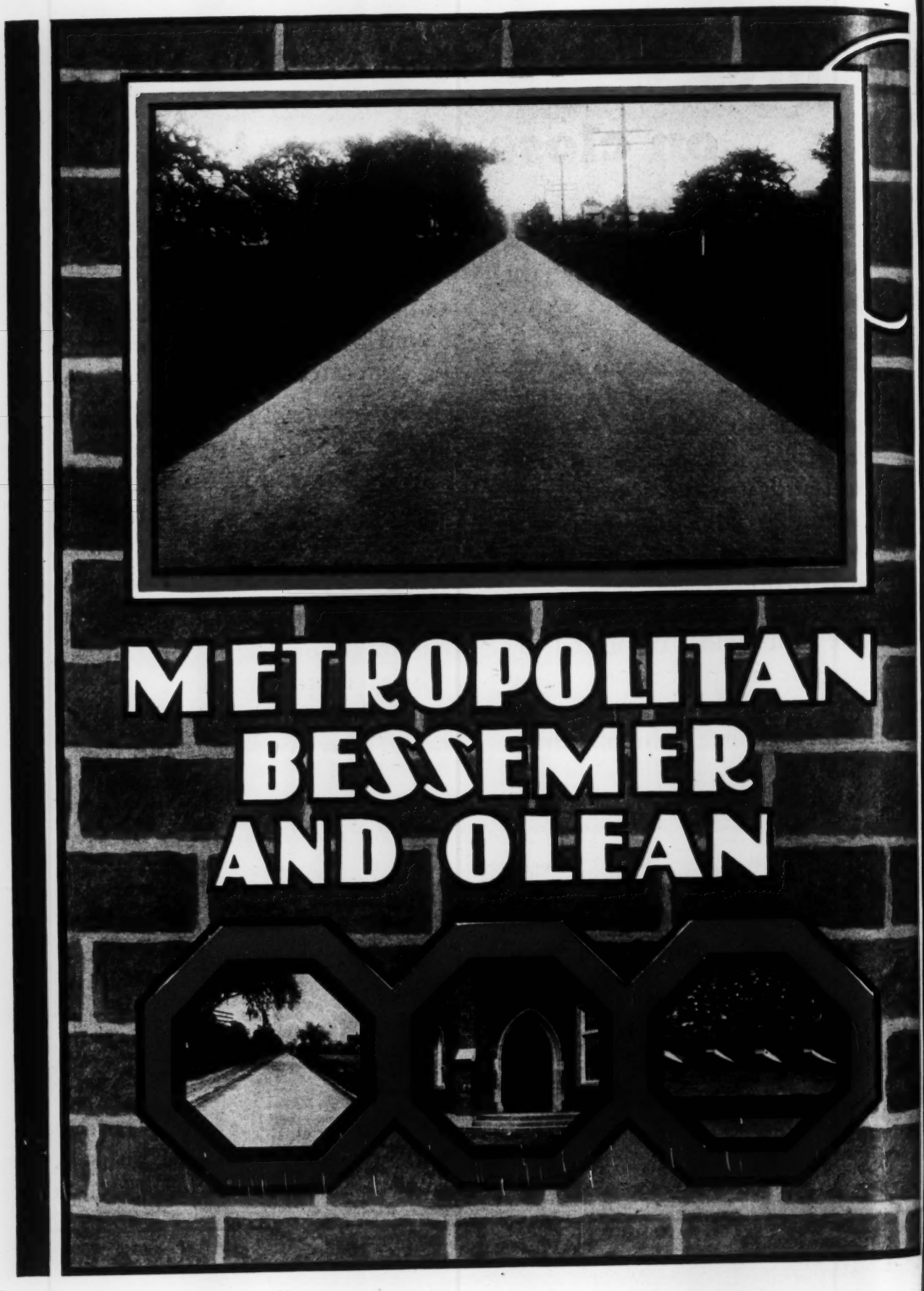
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BESSEMER
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and *it actually costs less to pave with brick*

ACTUAL figures from a county in northern Ohio show costs, including original investment and maintenance over a ten year period, were lower for brick than any other material. (Figures available upon request.)

Wherever a careful check on costs is recorded, Brick invariably shows a lower cost per square yard per year of service.

Metropolitan, Bessemer and Olean — three brands from America's largest producers of paving brick—have proved the most economical surface for roads and streets exposed to heavy traffic and seasonal changes. Specify any one of these three brands for lower road costs.

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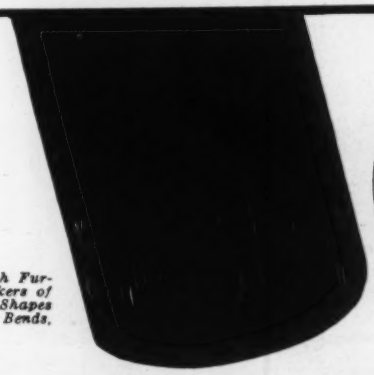

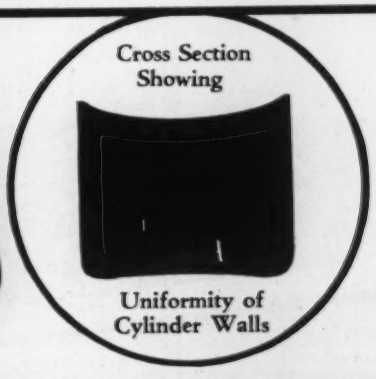

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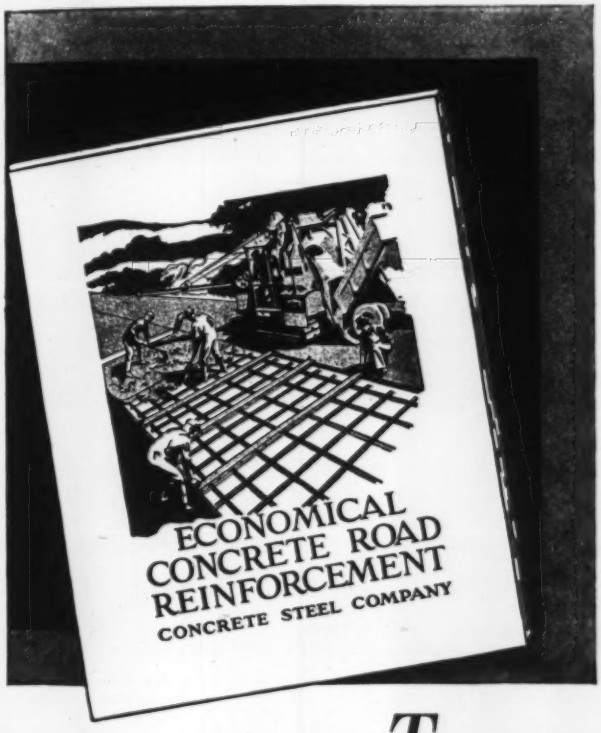

THIS valuable manual brings together in one place the latest information about modern concrete road reinforcement. It is interesting and instructive to seasoned engineers of long experience, and as well to new-comers in road construction. A copy of this 32-page illustrated Manual will be sent FREE to those who send us their request. Write us or use the Coupon below. There is no obligation. Concrete Steel Co., 42 Broadway, New York.

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Economical Concrete Road Reinforcement. (An introductory chapter describing advances that have been made in design and construction methods.)

Engineering Requirements for Paving Reinforcement. (Describing the need for correct placement of reinforcement and for economical methods of accomplishing this result.)

Construction Economies with Havemeyer Barmats. (Description of the Barmat and shipping and handling methods.)

Sequence of Operations in Placing Havemeyer Barmats. (A carefully illustrated section devoted to the methods of placing Barmats; including the use of Havemeyer Matrigs, marginal reinforcement, etc.)

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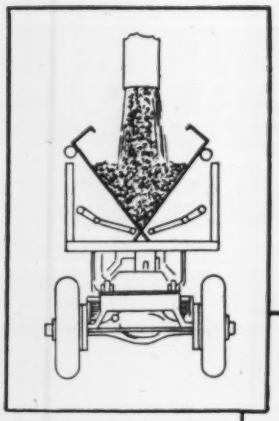
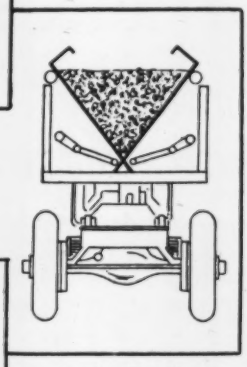
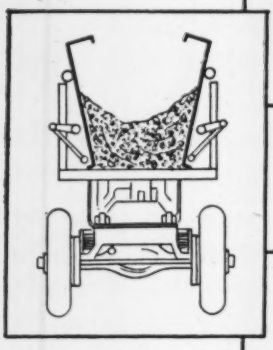
Representatives for the Dominion of Canada
Peacock Bros. Limited, Montreal



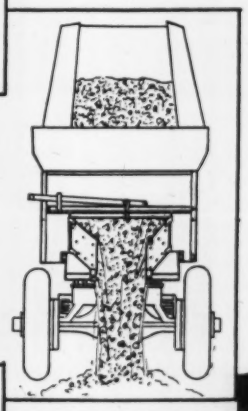
Truck receives *Wet Mix* from mixer. Water content is under control of *skilled* operator. Truck sides in V position.



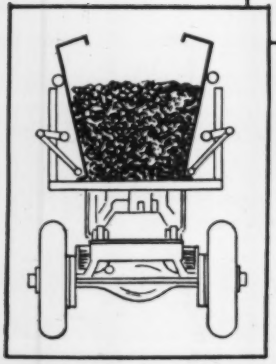
Transporting *Wet Mix to* destination. Sides in V position.



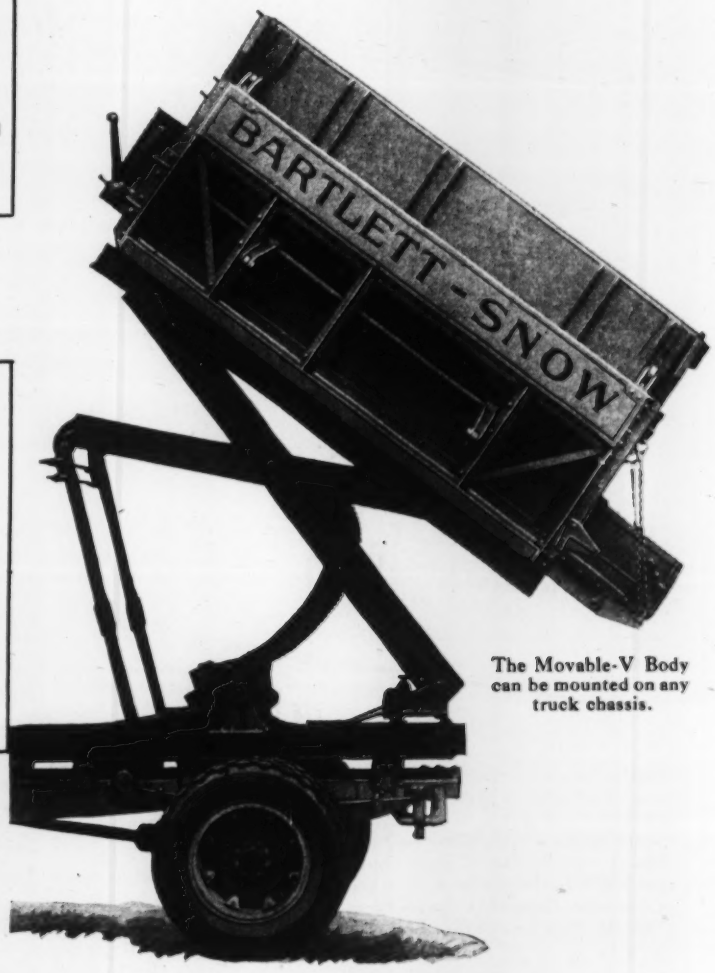
On the job. Sides are swung to vertical position, redistributing grout throughout the mass.



End gates are opened and truck body is tilted. The concrete pours out through the end gates which, because of their restricted opening, impart a final mixing action. A full-strength, uniform mixture is the result.



And with the movable V sides in the vertical position, this truck can be used to haul sand, gravel, stone or other bulk material.

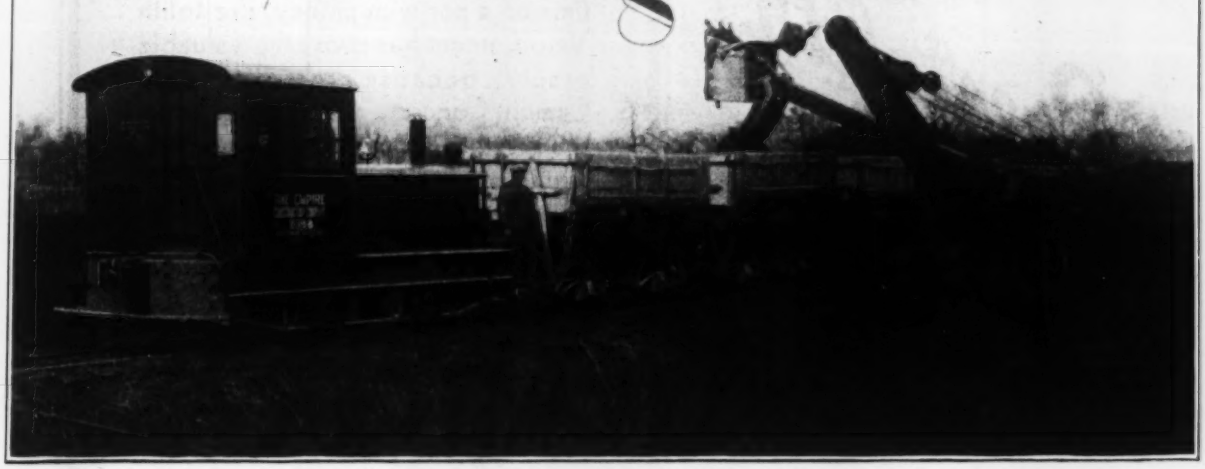


The Movable-V Body can be mounted on any truck chassis.

Bartlett-Snow Truck Bodies

CAN BE APPLIED TO ANY CHASSIS

Six Plymouths And A Young Canal



Down in Cincinnati they are building a new railroad terminal. To make room they had to move Mill Creek out of the way—dug a new channel 2 miles long, 44 feet deep, 80 foot wide at the bottom—a regular canal job.

Eight hundred thousand cubic yards to be moved elsewhere.

Four 20 ton Plymouth Locomotives—two 24 ton—six Plymouths in all, hauled all the dirt. Some of this work according to the contractor, necessitated running Plymouth hauled trains over 10% and 12% grades.

In spite of high water that at one time covered the steam shovel, the job was completed on time—the locomotives never giving a minute's dissatisfaction.

When you pay the price of Plymouths for Locomotives you deserve Plymouth Quality

PLYMOUTH LOCOMOTIVE WORKS

THE FATE-ROOT-HEATH CO., 303 RIGGS AVE., PLYMOUTH, OHIO

GASOLINE PLYMOUTH LOCOMOTIVES DIESEL

PLYMOUTH

Gasoline and Diesel Locomotives

Prestolith
BRAND REGD. U.S. PAT. OFF.

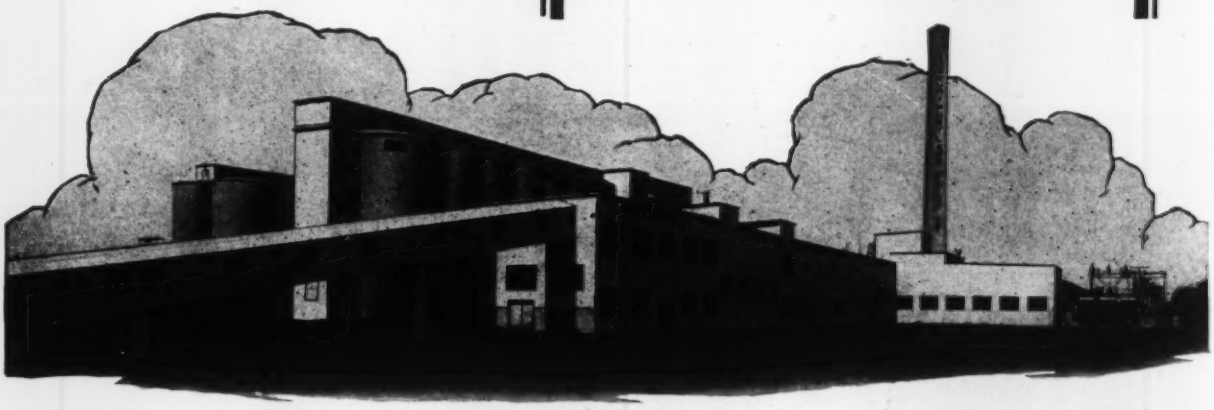
VELO CEMENT

« « PROGRESS

To the user of cement who places time on a par with money, Prestolith Velo Cement has proved a valuable asset...because Prestolith Velo Cement Concrete attains in 24 hours the strength required of normal Portland cement concrete in 28 days.

Anticipating the demand for speed and safety in concrete construction, the Missouri Portland Cement Co. has erected the $2,500,000 plant, illustrated below, for the exclusive manufacture of Prestolith Velo Cement. This is the first plant ever erected by any manufacturer for the sole production of high-early-strength cement.

Manufacturers of Red Ring Portland Cement for more than a quarter of a century. Write for complete literature.



MISSOURI PORTLAND CEMENT CO.
ST. LOUIS KANSAS CITY MEMPHIS

Manufacturers of "Red Ring" Portland Cement and "Prestolith" brand of Velo Cement. Producers of sand, gravel and Bethany Falls crushed stone.

TO MEET THE NEW TEMPO OF MODERN BUSINESS

THE McGRAW-HILL PUBLISHING COMPANY

ANNOUNCES THAT

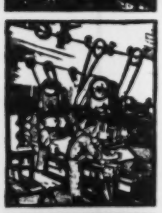
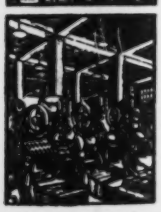
THE MAGAZINE OF BUSINESS

WILL HEREAFTER BE PUBLISHED WEEKLY
UNDER THE TITLE OF

THE BUSINESS WEEK

A Journal of Business News and Interpretation

BEGINNING WITH THE ISSUE OF
SEPTEMBER 7TH, 1929

THE BUSINESS WEEK

A Journal of Business News and Interpretation

"ACCELERATION, *rather than structural change, is the key to an understanding of our recent economic developments. Gradually the fact emerges . . . that the distinctive character of the years from 1922 to 1929 owes less to fundamental change than to intensive activity . . . Changes have not been in structure but in spread and speed.*"

—from the Report of the President's Committee on Recent Economic Changes.

SPREAD and speed!

How fast has grown the pace of business in the brief span of only three business generations!

In the 1870's the business man came down to his office and started the day by calling his employees, as he could call his customers, by name.

Business was *local*. The business man had immediate and firm control of his business operations—of his employees, his materials and his markets. Rare were the outside influences that touched the conduct of his business.

In Washington, there were only the makers of the tariff. His competition was the store across the street, the factory across the river; his markets were stable, steady. Of labor difficulties he had none; his machines were few and simple, and he knew all that were of use. What went on in the next state or in another industry was of no moment. Business enjoyed a self sufficiency that it will never know again.

◆ ◆ ◆

Consider, then, how vast have been the changes in sixty years: Quantity production, bringing new problems in manufacturing and marketing . . . The new importance of color and design . . . Mass distribution . . . Chain stores . . . Transportation and communication speeding up the pace of business . . . New conditions of competition . . . The new influence of government at Washington and the State Capitals . . . The new financial structure with vast trading on the exchanges and a widespread ownership of vast corporations . . . Most important of all, research . . . creating new industries—the automobile, the movie, rayon—destroying old ones . . . releasing thousands of workmen here . . . finding new tasks for them and for thousands more . . . Everywhere are new forces touching the conduct of business.

So complex have become the ramifications of business that to-day it has come to be the very essential of business management to have—*a knowledge of the news.*

The collapse of the wheat market in Chicago is not a local affair nowadays. It is not even a western matter. It has its repercussions in Wall Street. It has its meaning to the radio industry . . . It may hurt the silk importer . . . help the rayon mill.

A bank failure in Germany means something to-day to the hardware manufacturer in New Britain . . . It may well happen that

it will mean more than the crash of a bank at home.

◆ ◆ ◆

Observe how great has been the development in publishing for the business man—

A knowledge of happenings and developments within his trade, profession or industry has been so essential as to create a group of industrial, engineering and trade papers of paramount importance to the conduct of American business—providing the business man with an accurate knowledge of material supply, engineering and manufacturing methods, marketing conditions, sales methods, store, office and plant management.

Even the daily newspaper has expanded its business news to the point where it devotes entire sections to the daily news of business.

And yet, with the expanding need of business for facts,—for news,—there is still no single publication that provides the business man with a timely, complete and accurate record and interpretation of the news that touches the conduct of business.

The man who reads the daily newspaper, his trade or industry paper, and the business journals is still without that master-key to the news that he so badly needs in the fast-paced tempo of present-day business.

Over a period of years the McGraw-Hill Publishing Company has been observing and analyzing this condition, studying this growing problem of modern business. The first step was the acquisition of The Magazine of Business; the second, a systematic survey of the business man's need for news; the third, an analysis and organization of the sources of news. Now, the final step: The transformation of The Magazine of Business into The Business Week.

The Business Week with its appearance next September, the only business weekly of general interest, is the answer to the new compulsions of *Spread and Speed.*

◆ ◆ ◆

The Business Week will be operated so close to the news that the business world will get the news that counts while it is still hot; but it will be sufficiently *after the event* to enable the editors of The Business Week to clothe the facts with their full significance.

The Business Week will be generously staffed editorially. Trained news gatherers, able and experienced feature writers, economists and statisticians, will so co-ordinate the gathering of the facts and their presentation and interpretation that The Business Week will point straight to the news and its significance—and to the outlook for business.

The result, we are confident, with the co-operation of the McGraw-Hill staff of 128 editors, with the vast editorial resources which 26 McGraw-Hill Publications make available, will be to present to American business a journal of business news and interpretation not available from any other publishing source.

◆ ◆ ◆

The Business Week will be preeminently the business man's journal of business news, vital and vivacious, informative and dynamic, with something American in its every characteristic. It will be keyed to the spirit of the new tempo in American business.

IN CLOSER FOCUS

THE week by week contents of the Business Week will include these features and departments—

The News Interpreted: The introductory section of The Business Week will present the looming features in the news of the week; will discuss and interpret them with authority; with a style that will be alert, crisp, pithy.

It will highlight the outstanding news in a way to point its meaning for the man who must decide the policy of a business institution.

The Business Outlook: Business conditions in all industries and all sections, from the textiles of the North to the canneries of the far West, from the stores of Michigan Avenue to the docks of New Orleans, will be reviewed, checked up, co-ordinated, digested; so that the business man may have at hand each week a timely and brief insight into the trend of business,—may have an answer to his constant but unspoken speculation, "What's next?"

The Week in Washington: What is going on in Washington has much to do to-day with what is done in Detroit and Atlanta. And the National Capital will be thoroughly covered each week by the Washington Editor of The Business Week.

What is Happening in Business: The staff of The Business Week will be in touch with all the fields of business. Significant developments in every department of business—production, sales, management, and all the rest—will be reviewed, clearly and concisely.

Special Articles: Every week there are business developments so freighted with importance to the future of American industry and commerce that they demand special and extended attention. The Business Week will go direct to the fountain head for light on such news. It will present interviews with the great business men of the world who *make* the news. It will offer articles by them on the topics of pressing, immediate interest.

Editorial Leadership: The Business Week, dedicated to the conviction that the great new opportunities of business carry with them corresponding responsibilities upon the business man, will discuss and interpret the conduct of business with vigorous editorials.

It will stand always for the highest ideals of American business—a fair deal for business from government and the public; a fair deal from business for the consumer, the worker and the competitor.

The Business Week will have personality, convictions, a point of view. You may not always agree with its views; you will respect them and find them interesting.

Business in Its Human Phase: Because business is a very humanly interesting thing to business men, the trivial and the oddities, the side-lights and the cross-currents, the ingenious by-plays that make business a warm and fascinating subject—and an altogether human one—will be reflected and reported in The Business Week.

◆ ◆ ◆

In quality and appearance The Business Week will maintain the highest standards.

The size of the magazine will be 8¾ by 11⅞ inches; the size of the type page, 7 by 10⅜ inches. There will be three columns, 429 lines to the page.

The inside pages will be printed on book paper of the finest grade and exceptional weight. The covers will be 110 pound coated of the first grade; printed in color. The binding will be saddle-stitched.

There will be 28 pages—or more—of editorial text; the typography will be characterized by simplicity, spirit and readability. Illustrations will be both photographs and original drawings. There will be original cartoons.

Editorial forms will close Wednesday night. The issue, dated Saturday, will be on the newsstands Friday morning.

Final advertising forms will close on Friday of the week preceding publication—meaning a margin of only one week between the receipt of advertising plates and distribution to the reader.

The Business Week will be priced at 15c the copy; by subscription $5 the year.

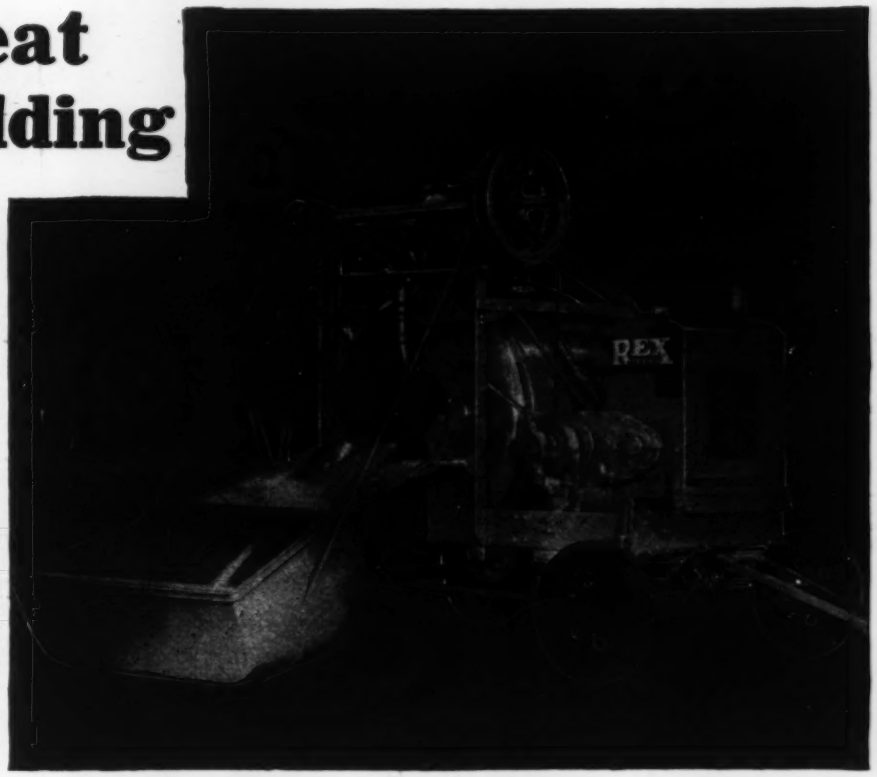
The advertising rate will be $600 the page; the agency commission 15 per cent; the cash discount two per cent.

The circulation at the outset will be 75,000, net paid, A.B.C.

McGRAW-HILL PUBLISHING CO., INC.

NEW YORK CHICAGO SAN FRANCISCO
BOSTON DETROIT ST. LOUIS
PHILADELPHIA CLEVELAND GREENVILLE
LONDON WASHINGTON

Two Great New Building Mixers That



set new standards in Design, Performance, Value

Gone are the thousand-pound top frames—

Gone are long countershafts to work out of line—

Gone are water valves that dribble—

Gone are old-fashioned, easily frozen drum rollers—

Gone are clumsy, exposed, grinding gears—

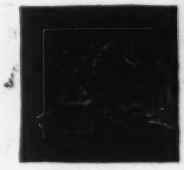
Gone is slow charging and discharging—

Gone is cast iron engineering.

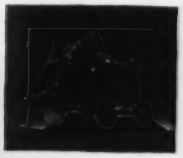
In spite of far advanced engineering and performance, Rex production facilities set prices on both the Rex 7-S and 10-S that establish new standards of value for every contractor's dollar.

See these two great mixers—coupon brings this catalog.

CHAIN BELT COMPANY, *733 Park St., Milwaukee, Wis.*



The Brand New Rex 7-S—patterned after the proven 10-S—end controls—Springhung axle—7-second charge and discharge—skeleton top frame—7-second accurate water—no countershaft—all clutches, take-offs, etc. assembled with engine—Timken Bearings—Pressed steel drum rollers and drum heads.



The Improved Rex 10-S—proved in basic design by a year on the test block—by a second year in the field—end controls—7-second charge and discharge—skeleton top frame—7-second accurate water—no countershaft—all clutches, take-offs, etc. assembled with engine—Timken Bearings—Pressed steel drum rollers and drum heads.

REX MIXERS

(Reg. U. S. Pat. Off.)

CHAIN BELT COMPANY
733 Park Street, Milwaukee, Wis.
Send me Catalogs on the mixers I've checked.

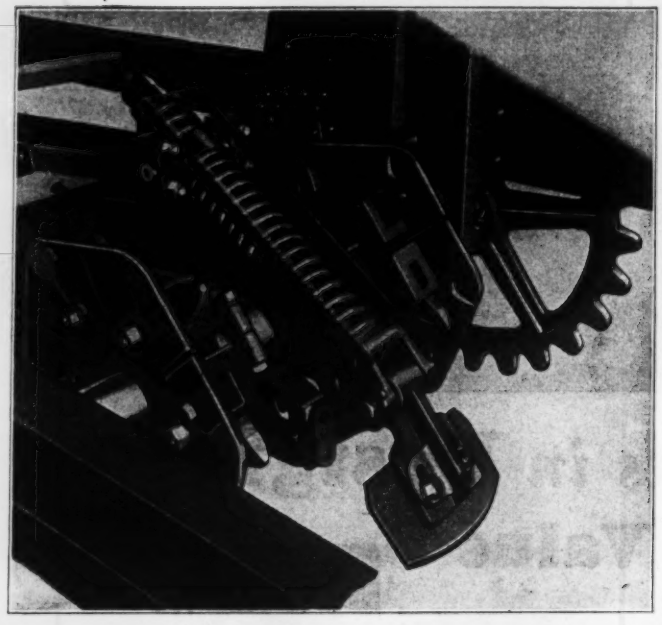
½-bag tilter	☐	2- to 3-bag 14-S	☐
½- to 1-bag 5-S	☐	6-bag 28-S	☐
1-bag 7-S	☐	12-bag 56-S	☐
1- to 2-bag 10-S	☐	27-E Paver	☐

Name_____
Address_____
City_____ State_____

The *ONLY* Trencher with a positive Spring Type BUCKET CLEANER

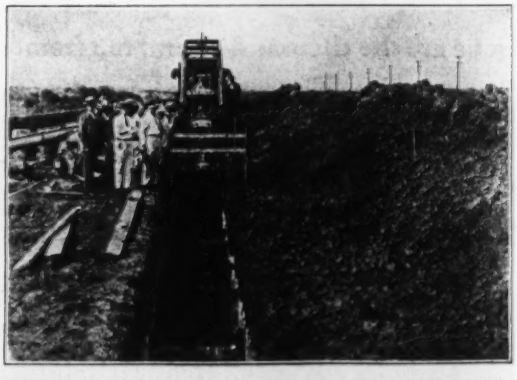
"AUSTIN PATENTED AND PROTECTED"

AUSTIN *"IMPROVED"*.. ..TRENCH EXCAVATORS



Above—Digging wet sticky clay with quick-sand bottom at Buffalo, N. Y. Machine dug 300 lineal feet of trench 15 feet deep and 30 inches wide in 8 hours.

Below—Texas Gumbo didn't stop this Austin equipped job. Note stickiness of soil. It takes an Austin to duplicate this digging efficiency. Job time estimated at 200 days—completed in 48 days.



Clean buckets mean greater yardage—the job will go on regardless of soil conditions.

There is only one Positive Spring Type Bucket Cleaner—the Austin. Due to its construction the maintenance cost is low—it can not jam in buckets—bucket line can be reversed without interference by cleaner.

The Austin Patented Bucket Cleaner is shaped to the buckets—sweeps through and cleans most satisfactorily. A Spring keeps cleaner plate against the bucket—after it passes through, the recoil of spring cleans off the clinging particles from plate. Cleaner is mounted on end of boom so shocks are not relayed to excavator drive shaft.

AUSTIN
MACHINERY CORPORATION
MUSKEGON · MICH.

DISTRICT SALES OFFICES

NEWARK, N. J., 326 Frelinghuysen Ave.
ST. LOUIS, MO., 1504 N. Broadway
CHICAGO, ILL., 315 Railway Exchange Bldg.
CLEVELAND, O., Forest City Bank Bldg.
DALLAS, TEX., 209½ N. Clinton St.
TORONTO, CANADA, 17 Waller Ave.
LOS ANGELES, CAL., 1947 Mateo St.
SAN FRANCISCO, 1232 Hearst Bldg.

Representatives in 51 Cities Throughout the United States — Name of Nearest Representative Sent on Request

SELECTED FOR SERVICE!

When the New York Central Railroad erected this great 35-story building squarely across Park Avenue (one of New York's greatest arteries of traffic) north of the Grand Central Terminal, it cut two roadways through the building to take care of north and southbound traffic. One might think that the paving of these roadways would be a problem, under such circumstances.

It was NOT a problem—to the New York Central Railroad. Having had 20 years' experience with Asphalt Blocks on various roadways and areas subjected to heavy traffic in and about the Grand Central Terminal, this great railroad selected Hastings Heavy Duty Asphalt Blocks for the job.

One of these roadways shows in the above picture.

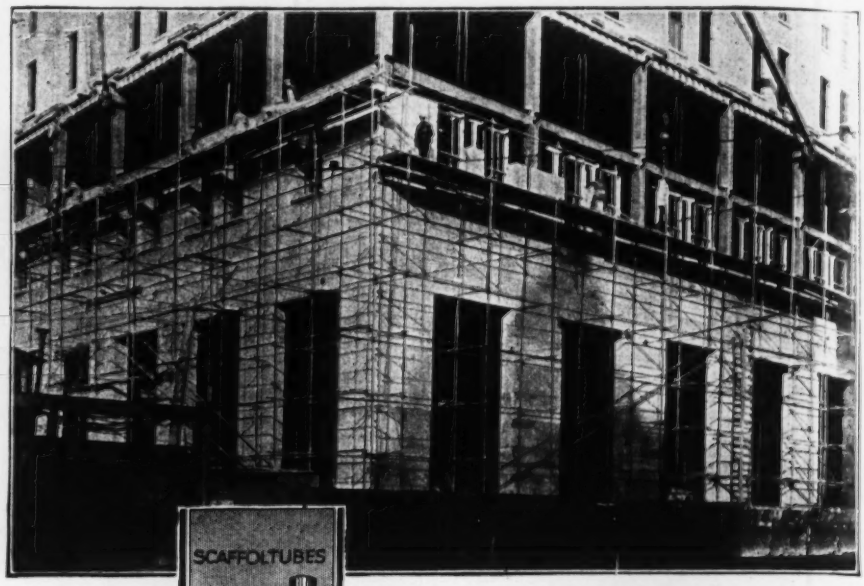
THE HASTINGS PAVEMENT CO.
25 Broad Street, New York City

HASTINGS ASPHALT BLOCKS

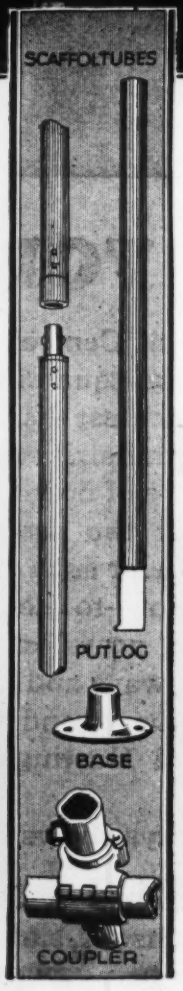
for Industrial Floors—Piers—Bridges—Viaducts—Platforms—Streets

6 Scaffold Savings

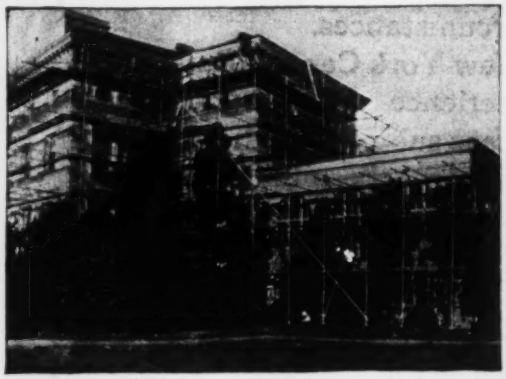
1. "Patent Tubular" is used over and over again without waste or deterioration.
2. Fire hazard eliminated. Wood Scaffold fires claim millions in damage yearly.
3. Quicker erection and dismantling by the contractor's own men reduces labor expense.
4. Minimum obstruction to wind, light and view; noiseless erection;—these are closing arguments that get jobs where interruptions to business otherwise blocks the work. Business premises, banks, churches, etc., are scaffolded without interference.
5. Maximum safety of working conditions brings lowered accident costs.
6. "Patent Tubular" can be rented by the job or bought outright, whichever is most economical for the contractor.



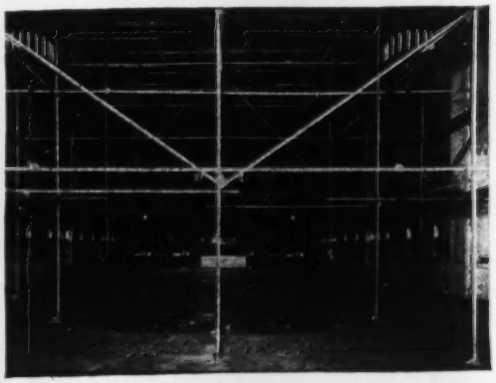
Masons on this stone faced building in Buffalo worked as safely as at a factory bench.



"Gold Medal" PATENT TUBULAR SCAFFOLDING



Another type of exterior job. "Patent Tubular" is as completely adaptable to varied forms as its kindred product, the "Gold Medal" Steel Sidewalk Bridge, of which we are the originators.



Special advantages in scaffolding interiors, with "Patent Tubular" are numerous. A promise of noiseless erection, no interruption to business and elimination of fire hazard secured this bank remodelling job.

Write the nearest branch for fully illustrated Catalog.

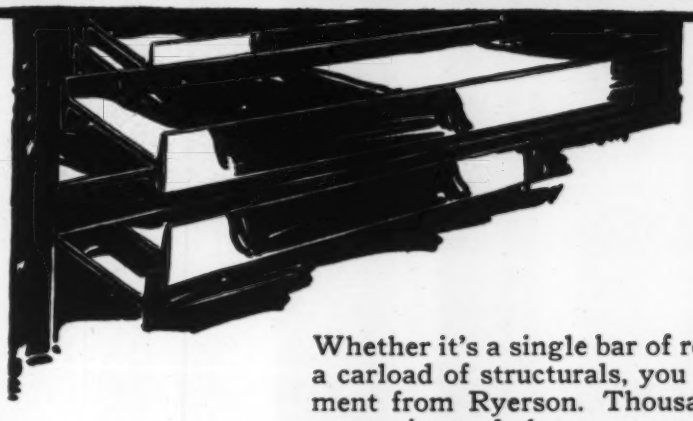
The Patent Scaffolding Company

Chicago, Ill., 1550 Dayton St.
Philadelphia, Pa., 2835 Bridge St.
Pittsburgh, Pa., 518 Foreland St., N.S.
Boston, Mass., 49 Ellery St.
St. Louis, Mo., 6168 Bartmer Ave.
Atlanta, Ga., 44 Haynes St., N.W.
San Francisco, Cal., 270 13th St.
New York, N. Y., 647 W. 50th St.

Gold Medal

Safe Ladders and Scaffolding for Every Purpose

When You Need Steel—Call Ryerson



Whether it's a single bar of reinforcing, a few bolts or a carload of structurals, you can get immediate shipment from Ryerson. Thousands of tons of steel, in every size and shape, are carried in stock, subject to your beck and call.

These tremendous stocks or reserves are conveniently located throughout the country—there is one near your job or shop. When necessary one plant backs up another in giving a complete service on all steel products.

If it's steel—Call on Ryerson.

Write for the Ryerson Journal and Stock List—the key to Immediate Steel. Eight separate editions are published covering stocks at various points. Just indicate the localities in which you are interested—we'll send the books you need.

JOSEPH T. RYERSON & SON INC.

Plants: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Jersey City

Representation in: Minneapolis, Tulsa, Kansas City, Rockford, Dallas, Newark, New York, Denver, Los Angeles, San Francisco.

RYERSON

STEEL-SERVICE

The concrete highway from Cape May to Rio Grande, N. J. Lastingly smooth because it is protected by Carey Elastite Expansion Joint, transversely installed at frequent intervals.

with nary a hump or a hollow!

Folks who motor through New Jersey's fertile farm lands remember this winding road. It's one of the smoothest concrete highways in the East. And it will *stay* smooth, too, for a long, long time, because it's protected with Carey Elastite Expansion Joint.

The unfailing sandwich-joint protection for concrete! Made of a fibrous asphalt compound, high-pressure-placed between holding strips of asphalt-saturated felt. It "gives and takes"—it packs with the impact of traffic—it keeps concrete smooth and extends its life.

Get acquainted with Carey Elastite Expansion Joint! Know why leading engineers use and endorse it—why this logical protection is used in every State in the Union. Write for information on modern methods of Expansion Joint installation.

Carey Elastite EXPANSION JOINT

THE PHILIP CAREY COMPANY — *Lockland,* CINCINNATI, OHIO

The Center of Attraction

In general excavation work, road building, subway construction, tunneling, quarrying — in fact, every place where rock is drilled, the new I-R machines have been the center of attraction since their introduction in July, 1928.

They are sensational for their speed of drilling and ease of holding. They have set new standards of efficiency for both shallow—and deep-hole drilling.

There is a size available to meet the conditions of the small job or the large job.

Write or call our nearest Branch for details of these new machines.

INGERSOLL-RAND COMPANY
11 Broadway New York City

Ingersoll-Rand

For Economy

Choose a *High-Early-Strength Concrete* That Is Adaptable To Your Design

You probably refuse to authorize or pay for more over-time work than is necessary. Similarly, you no doubt are unwilling to specify or pay for 1-day concrete when you can allow 3, 5 or more days for curing and still meet your schedule. In short, whether it's time or strength, you want to pay only for what you need.

One good reason for using *High-Early-Strength Universal* Concrete is that it can be adapted to fit special requirements on each job or on different parts of the same job. With it you can set 3, 5, 7 or any number of days as the time at which you desire a given strength, and design the concrete accordingly at a cost in direct proportion to the results.

Such concrete also is economical because it requires no special materials. The *same* aggregates and the *same* Universal cement that are used for regular work produce *High-Early-Strength Universal* Concrete when mixed and placed by tested methods. And best of all, these methods not only give the required high-early-strength, but also assure concrete that is permanently stronger, denser and more durable. Full description of these money-saving methods will be furnished on request. No obligation. Just mail the coupon.

These booklets contain description of methods for obtaining High-Early-Strength Universal Concrete. Either or both will be mailed you on request. Just use the coupon.

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CONSTRUCTION NEWS

Some of the Week's Large Projects

AMONG the announcements for the current week are the following:

Proposed Work

Railroad, Texas, Ft. Worth & Denver City Ry., Denver, Colo., est. $4,000,000. This corrects report published in June 13 issue.

Terminal and warehouse, Brooklyn, N. Y., Water Front Service Corp., $3,000,000.

Store, Portland, Ore., Meyer Frank Co., $2,000,000.

Apartment, Brooklyn, N. Y., C. Levy, c/o G. and E. Blum, archts., New York, $2,000,000.

Substation, Toronto, Ont., Toronto Hydro Comn., $1,700,000.

Apartment, New York, N. Y., Two Hundred West 16th Street Corp., $1,600,000.

Apartment, Chicago, Ill., L. F. Urbain, archt., soon takes bids for Syndicate, c/o archt., $1,600,000.

Prison institution, Plymouth, Mich., Detroit House of Correction, Detroit, $1,250,000.

Office, London, Ont., Huron & Erie Mortgage Corp., $1,000,000.

Out-patient, Phila., Pa., Jefferson Hospital, $1,000,000.

Office, New York, N. Y., Brandish Johnson Estate, $1,000,000.

Office, Flushing, N. Y., H. E. Whittemann, Brooklyn, lessee, $1,000,000.

Theatre, etc., Beaumont, Tex., T. P. Lee and M. F. Yount, est. $1,000,000.

Bids Asked

Airport, Pittsburgh, Pa., July 2, by R. G. Woodside, controller Allegheny Co., $1,900,000.

Paving, Pittsburgh, Pa., July 2, by R. G. Woodside, controller Allegheny Co., $1,500,000.

Office, Portland, Ore., Architect takes bids about Sept. 13, for Selling, Hirsch & Sichel Co., $1,600,000.

Office and store, Chicago, Ill., Architects take bids about July 10 for J. R. Thompson Co., $1,500,000.

Seminary, Webster Groves, Mo., July 9, by architect for Catholic Archdiocese of St. Louis, $1,250,000.

Hotel, Guelph, Ont., A. W. Cutten, takes bids about July 20, $1,000,000.

Bank and office, Ft. Wayne, Ind., July 5, by architect for Lincoln Bank Co., $1,000,000.

Public Bond Elections, coming and decided, are listed on Construction News page 383.

Bids Received

Cruisers, Wash., D. C., Navy Dpt., from Bethlehem Shipbuilding Corp., Quincy, Mass., $10,753,000.

Contracts Awarded

Electric generating station, Michigan City, Ind., architects to Herlihy Bros., Chicago, Ill., for Northern Indiana Public Service Co., Hammond, $10,000,000.

County, Seattle, Wash., City, Comrs, King Co., to H. Paderson, Seattle, $2,148,708.

Exchange, Pittsburgh, Pa., Bell Telephone Co. of Pennsylvania to W. F. Trimble & Sons, Pittsburgh, est. $1,500,000.

Medical, New Orleans, La., Architects, to G. J. Glover Co., Inc., New Orleans, for Tulane University, est. $1,000,000.

Apartment, New York, N. Y., Claremont Parkway Corp., separate contracts, $1,000,000.

Construction News of the Week

Waterworks

Proposed Work

California—State Dpt. Water Rights, Sacramento, granted permit to J. E. Green & R. P. Hawkins, Alleghany, to divert 20 cfs. from Kanaka Creek, Sierra Co., for water supply for town of Alleghany, $20,000.

Calif., Martinez — California Water Service Co., Hunter-Dulin Bldg., San Francisco, reservoir, 20 ft. high covering 150 acres, invol. 450,000 cu.yd. earthwork, 500,000 sq.ft. gunited embankment, pumps, 3 pumping plants, 24,000,000 gal. daily capacity, 2 mi. 60 in. pipe line from pumping plants to reservoir for supplying Concord, Crockett and Port Costa, Contra Costa Co. Private plans.

Colo., Lamar—Surveys extending mains, $40,000. E. T. Archer & Co., 609 New England Bldg., Kansas City, Mo., consult. engrs.

Ind., Bloomington—Waterworks, light plant, Burns & McDonnell Eng. Co., 402 Interstate Bldg., Kansas City, Mo., engrs.

Kan., Kansas City—For 36 in. main in 18th St. from Quindora plant to Kansas Ave. Burns & McDonnell Eng. Co., 401 Interstate Bldg., Kansas City, Mo., engrs.

Mass., Wellesley (br. Boston) — Extending waterworks, $15,000 appropriated.

Mich., Oak Park—Village, 26,668 ft. 4- to 8-in. c.i. mains in Special Assessment Dists. 11 and 12, 6,750 ft. 12- to 42-in. concrete sewer in Special Assessment Dist. 10. Pate, Bacon & Hamann, 922 Transportation Bldg., Detroit, engrs.

Mich., Pontiac—Extending 10,000 ft. 6 and 8 in. c.i. mains in Oakland Ave. and South Blvd. $35,500. J. R. Pollock, City Hall, engr.

Mo., Hermann — Preliminary plans 100,000 gal. rein.-con. storage reservoir. Russell & Axon, 6200 Easton Ave., Wellston, and 408 McDaniel Bldg., Springfield, engrs.

N. Y., Buffalo—G. Fisk, comr. P. Wks., Municipal Bldg., 7,191 ft. 6 and 8 in. mains in North Lincoln Blvd., Bedford Ave., Nottingham Terrace, Middlesex, Hallam, and Dana Rds. C. E. P. Babcock, city engr.

O., St. Paris—Bd. P. Wks., G. Urban, clk., waterworks, incl. 6 mi. mains, 100,000 gal. steel elevated storage tank pumping equipment, $60,000. Jennings-Lawrence Co., Hartman Bldg., Columbus, engrs.

Okla., Hugo — Preliminary plans changing pumping plant to motor driven centrifugal pumps, incl one 500, two 300 and two 350 g.p.m. pumps, motors, $7,000. H. G. Hixon, Hugo, engr.

Ont., Harrow—Council waterworks pumping plant, mains, $35,000. A. W. Connor, Metropolitan Bldg., Toronto, engr.

Ont., Sandwich—Sandwich South and Sandwich West Twps. extending watermains, $60,000. Keith, Border Utilities Comn., Windsor, engrs.

Ont., Toronto—North York Twp., 2 mi. 6 in. c.i. mains in Maple Dr., Armour and Ridley Blvds, $15,000. G. H. Baker, Township Offices, Willowdale, engr.

Bids Asked

Calif., Holtville — July 26, by E. M. Carpenter, city clk., pumping unit 1,200 gal. per minute against head 105 ft. motor.

Calif., Oakland—July 10, by J. H. Kimball, secy. East Bay Municipal Utility Dist., 2,331 tons c.i. pipe, six hundred eighty-five 4- to 20-in. gate valves; constructing Claremont Cistern and Gate House, Claremont laboratory and 600 ft. 54 in. diam. pipe of 7/16 in. plate.

Md., Baltimore — July 2, by Bd. Awards, pumping equipment at Vernon Pumping Station. E. G. Rost, water engr.

Mass., Watertown — Town, Water Comrs., taking bids for pumping equipment, c.i. pipe, special castings, hydrants, valves and valve boxes for waterworks.

Miss., Forest—July 2, by Morgan & Co., Inc., engr., Forest. 300 gooseneck and corporation cocks, 300 curb cocks, boxes, 4,000 ft. ¾ in. galvanized service pipe, 1,000 ft. ¾ in. lead pipe, 1,000 ft. ¾ in. copper wire, topping machine. Noted Apr. 18.

THESE reports are grouped under each class (water-works, sewers, etc.) and under each stage of the work (proposed, bids asked, etc.) according to the alphabetical order of states.

Where name of official is not given inquiries should be addressed to City Clerk, County Clerk, or corresponding official.

Miss., Houston—July 5, by Mayor, concrete reservoir with concrete roof, motor driven pumps, valves, hydrants, 21,040 ft. 4- to 6-in. c.i. mains, 16,000 lb. specials, 1 m.g. concrete reservoir. Klyce & Harrub, 4th & 1st Bank Bldg., Nashville, Tenn., engrs. Noted May 16.

Miss., Macon—July 2, by Mayor, deep well, centrifugal pumps vertical motor, horizontal centrifugal pump and motor to deliver 500 gal. water power against head of 85 lb., 550 ft. 6 in. b.s. c.i. mains.

Mo., Poplar Bluff—July 15, by C. M. Harwell, city clk., two 100,000 gal. filter units, 500,000 gal. tank on tower. W. A. Fuller Co., 2916 Shenandoah Ave., St. Louis, engrs. Noted May 30.

Nev., Hawthorne—July 15, by S. T. Kelso, clk. Mineral Co., waterworks, 7,506 ft. 2 in., 30,614 ft. 4 in., 8,802 ft. 8 or 7 in. pipe, 250,000 gal. rein.-con. reservior. Noted May 30.

N. J., Jersey City—July 2, by Bd. City Comrs., City Hall, iron body, bronzed mounted double hub valves, to Bureau of Water, $5,000. C. A. Van Keuren, city engr.

N. Y., Brooklyn — July 2, by J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, mains in Gerald, Fort Greene and Hanson Pls., Avenues J, M, P and Q, Driggs, Vanderbilt, Atlantic, Foster, Rogers, Sutter, Williams, 20th, 21st Aves., Carroll, Bay 13th, East 34th, East 48th, East 49th, East 93rd and West 13th, Holly, Lafayette, and Withers Sts.

N. Y., Long Island City—July 2, by J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, mains in 57th Rd., 65th Pl., Clara Court., 24th, 41st, 53rd, 56th and 63rd Aves., Exeter, 80th, 81st, 82nd, 84th, 86th, 98th and 111th Sts.

N. Y., New York — July 2, by J. J. Dietz, comr. Water Supply Gas & Electricity, Municipal Bldg., mains in Eastchester Rd.

Okla., Maud—July 3, by J. Ingle, city clk., 2 wells, 20,500 ft. 4- to 8-in. c.i. main extension, $28,000. Long & Co., 1300 Colcord Bldg., Oklahoma City, engrs. Noted Apr. 11.

B. C., Vancouver—July 11, by E. A. Cleveland, engr., 500 Beatty St., twenty-two 18 in. and over, ninety-five 12 in. and under valves, for Greater Vancouver Water Dist.

Ont., Toronto—July 2, by S. McBride, mayor, two electric portable centrifugal pumping units, $3,000. R. C. Harris, City Hall, engr.

Contracts Awarded

Ia., Irwin—For 11,276 ft. 2- to 8-in. c.i. pipe, 30,000 gal. tank on tower, 18 hydrants, 11 valves and boxes, installing same, to C. W. Roland Co., 1347 8th St., Des Moines, $15,025; 8 in. gravel treated well, to E. C. Archibald, 2200 Avenue A, Council Bluffs, $758; deep well, turbine pump, 7½ hp. motor, installing pump and motor, to Byron & Jackson, $1,114. Grand total $16,897. Est. $17,000. Noted May 2.

Mich., Detroit—Dpt. Water Supply, D. C. Grobbel, acting secy., substructure for low lift pumping plant Springwells Station, to E. H. Lathan Co., 447 Neilston St., Columbus, O., $403,969. Noted May 9.

Miss., Tchula — Pump house, 100,000 gal. concrete reservoir, monocast pipe, to Ratson & Reed, Wiggins, $12,826; 50 hydrants, 37 valves and boxes; 21,400 ft. monocast pipe to Dixie Mill Supply Co., 901 Tchoupitoulas St., New Orleans, La., $17,944; 100,000 gal. tank on tower, to Chicago Bridge & Iron Wks., Dallas Natl. Bank Bldg., Dallas, Tex., $5,970; 2 motor driven pumps, to Fairbanks-Morse & Co., 1900 St. Charles St., New Orleans, La., $1,942; gasoline motor driven pump, to A. M. Lockett & Co., Q. & C. Bldg., New Orleans, La., $1,800. Grand total $40,482. Noted May 23.

Miss., Valden—Wooden tank, concrete reservoir, house services, hauling and installing pipe.

See proposal advertising on page 110

Constr. News page 373

LEADITE

Trade Mark Registered U.S. Pat. Office

Over 1,000 Miles of Water Mains laid by these 9 Water Plants

—and "every joint" was made with

LEADITE

Fort Worth, Texas
192.85 Miles
Sizes 4" to 36"

New Bedford, Mass.
25 Miles
Sizes 4" to 48"

Tulsa, Okla.
37 Miles
Sizes 6" to 36"

Dayton, Ohio
128.25 Miles
Sizes 4" to 84"

Pouring 60-in. cast iron bell and spigot pipe joint with LEADITE.

Oklahoma City, Oklahoma
94.50 Miles
Sizes 6" to 30"

Penna. Water Co.
210 Miles
Sizes 4" to 42"

St. Louis, Mo.
90 Miles
Sizes up to 36"

Washington Suburban Sanitary District
Hyattsville, Md.
150 Miles
Sizes 4" to 24"

When it is considered that these 9 Water Plants alone, have used LEADITE for jointing more than 1,000 Miles of Water Mains (ranging in sizes from 4-in. to 84-in. diameter, and for pressures varying from 20 to 220 lbs. per square inch), —some idea may be had of the huge total of Water Mains which have been jointed with LEADITE by other Cities—Towns—Private Water Companies—Engineers—Construction Companies—Water Departments of Large Industrial Plants, Railroads and Mines, etc.

Long experience has proven that LEADITE: Makes Tight joints. Withstands vibrations. Does not corrode or rust. Resists electrolysis. Eliminates caulking, and Reduces the cost of digging large bell holes—"Speeds up the completion of the job."

On thousands of miles of Water Mains jointed with LEADITE —all over the country, complete satisfaction has resulted.

LEADITE may be used on any size bell and spigot pipe joint, —and is effective, regardless of the working pressure employed.

The pioneer self-caulking material for c. i. pipe.
Tested and used for over 30 years.
Saves at least 75%"

THE LEADITE COMPANY
Land Title Building - - Philadelphia, Pa.

No Caulking

Waterworks (Continued)

to B. E. Walker Constr. Co., Forest, $12,598; pumps, to Fairbanks-Morse & Co., 1900 St. Charles St., New Orleans, La., $1,401; valves, boxes, to Beacham Supply Co., Jackson, $2,278; open joint pipe, to McWane Cast Iron Pipe Co., 2700 11th Ave., Birmingham, Ala., $13,538. Grand total $29,815. Noted May 23.

Neb., Hastings—Service mains in Dist. F., to Mid-State Constr. Co., South and Garfield Sts., $33,236.

N. J., Elizabeth—Elizabethtown Water Co., 64 Broad St., 1 story, 45 x 60 ft. pumping station, rein.-con. cofferdam, to Keep Constr. Co., 270 Morris Ave. Est. $25,000. Noted June 6.

N. Y., Brooklyn—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, mains, appurtenances in Eastern Parkway, to George V. Cornell Co., 30 Egbert Pl., St. George, $7,491. Noted June 6.

N. Y., New York—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., mains in Amsterdam, Lexington, Pleasant, 2nd, 4th, 9th and 12th Aves., to Riverdale Water Works Corp., 1 Riverdale Ave., $99,999. Noted June 6.

O., Bexley (Columbus P. O.)—S. W. Roderick, village clk., 5,200 ft. 8 and 16 in. c.i. mains in Maryland Ave., Gould Rd., Main and Mound Sts., to Central City Constr. Co., 209 South High St., Columbus, $57,142.

O., Lexington—Village, 3 mi. 4- to 8-in. c.i. mains, to G. A. Harrop, South Bend, Ind., $18,591; 100,000 gal. steel elevated tank, to Chicago Bridge & Iron Co., 37 West Van Buren St., Chicago, Ill., $6,490; 150 g.p.m. pump, to Layne-Ohio Co., Goodale Bldg., Columbus, $3,471. Grand total $28,552.

O., Van Wert—For 1¼ mi. 12 and 8 in. c.i. mains, to S. L. Cothrel, 1706 Jefferson Ave., Toledo, $12,726; 400,000 gal. elevated steel storage tank, to Chicago Bridge & Iron Co., 37 West Van Buren St., Chicago, Ill., $25,275.

O., Youngstown—Mahoning Valley Sanitary Dist., City Bank Bldg., W. H. Dittoe, ch. engr., constructing Youngstown Feeder Mains. Contr. 17, 42 in. smooth bore steel pipe, to Penstock Constr. Co., Sharon, Pa., $494,832. Noted Apr. 25.

Pa., Pittsburgh—Bureau Water, City-County Bldg., general repairs Bedford Reservoir, to Frank K. West & Co., Pittsburgh, $8,063; relining same, to Rust Eng. Co., Koppers Bldg., $10,769; electrical work, to Delmer Electric Co., 17 Shingiss St., $423; plumbing, to M. S. Martin, 1411 Webster Ave., $1,539. Grand total $20,794. Est. $25,000.

R. I., Warwick—Town, c.i. mains, to Bruno & Petitti, 18 Tremont St., Boston, Mass., $171,675. Noted May 23.

Utah, Lewiston — City Council, 21,915 ft. ¾- to 3-in. galv. iron pipe, 15,820 ft. 4- to 6-in. mathison joint with dresser coupling, to Crane Co., Salt Lake, $17,289; trenching and laying above, to Wheelwright Constr. Co., Ogden, $8,000.

Wis., Milwaukee—Water-tight lining reservoir, to Cement Gun Co., Allerton, Pa., $42,217.

Wis., Milwaukee—Dpt. P. Wks., R. E. Stoelting, comr., 1,896 ft. 6- to 16-in. c.i. mains in Commerce St., to H. Hohensee, 1282 10th Ave. $9,048; 5,647 ft. 6- to 12-in. in Keefe, Vienne Aves., 30th, 93rd, Towsend Sts., to Ribbens Bros., 1982 Woodburn St. $6,451. Noted May 30.

Ont., Hamilton—Filling waterworks filtration basins in Saltfleet Twp., to Huffman Constr. Co., 22 Murray St. W., $47,760.

Sewers

Proposed Work

Colo., Lamar — Surveys extending sewerage system, $42,000. E. T. Archer & Co., 609 New England Bldg., Kansas City, Mo., consult. engrs.

Ga., Jonesboro—Sewer mains, septic tanks, J. B. McCrary, Citizens & Savings Bank Bldg., Atlanta, engrs.

Kan., Ottawa — Sewage plant, $100,000 Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs. Noted Mar. 7.

Mich., Port Huron—Concrete and vitr. sewers with connections, manholes in 4 streets in South Park Dist. $44,000. D. D. Worcester, City Hall, engr.

N. J., Haledon (mail Paterson) — Bd. Boro Council, Boro Hall, preliminary plans sanitary sewers in Old Paterson Hamburg Turnpike, Avenues C and B, Jasper St. and Albion Aves. $25,000. Schelling & Spinnler, 242 Main St., Paterson, boro engrs.

N. J., Leonia—Bd. Boro Council, Boro Hall, preliminary plans repairing and equipment, present disposal plant, incl. chlorine tanks, enlarging north sewer. $33,000. C. Eckerson, 353 Broad Ave., boro engr.

Okla., Cement — Sanitary sewerage system, $28,000. C. S. Wages, city clk.

Okla., McAlester—Preliminary plans extending storm sewers $25,000. J. B. McAlester, mayor. Engineer not selected.

Okla., Nowata—New sewage disposal plant, $40,000. E. W. Gantt, 1116 West Main St., Oklahoma City, engrs. Noted.

Tenn., Lewisburg—Preliminary plans sewage disposal plant. $40,000. A. McCord, mayor. Engineer not selected.

Wis., Foxlake — Sanitary sewers, disposal plant. $50,000. Druar & Milinowski, Globe Bldg., St. Paul, Minn., engrs.

Bids Asked

Ill., Westchester — July 1, by Bd. Local Impvts., sewerage system. R. N. Nelson, secy.

Md., Towson—July 1, by Comrs. Baltimore Co., vitr. sewer in Overlea. Contr. 16-S. B. L. Crozier, Court House, ch. engr.

Miss., Houston—July 5, by Mayor, complete sanitary sewerage system, incl. house connections, manholes, 48,460 ft. 6- to 15-in. sewers, 6 house branches, 160 manholes, flush tanks, concrete disposal plant. Klyce & Harrub, 4th 1st Bank Bldg., Nashville, Tenn., engrs.

Mo., Fredericktown—July 9, by City Clerk, 11,507 ft. 8- to 15-in. vitr. clay, 730 ft. 10, 12 and 16 in. c.i. pipe, 43 non-auto flush tanks, disposal plant. $100,000. W. A. Fuller Co., 2916 Shenandoah Ave., St. Louis, engrs. Noted June 13.

N. J., New Milford—July 2, by Bd. Boro Council, Municipal Bldg., storm drainage system in Graphic Blvd. $50,000. Former bids rejected. A. Noack, 136 Main St., Hackensack, engr. Noted Apr. 25.

N. Y., Buffalo—July 5, by G. Fisk, comr. P. Wks., Municipal Bldg., 8½ x 10 ft. and 8½ x 15½ ft. double rectangular, rein.-con. drain between Erie Canal and west line Niagara St. and 8½ x 13½ ft. rein.-con. drain in Cornelius Creek between west line Niagara and Tonawanda Sts. C. E. P. Babcock, city engr.

N. Y., New York—July 2, by J. Miller, pres. Manhattan Boro, Municipal Bldg., sewer in East 57th St.

O., Cleveland—June 29, by Comrs. Cuyahoga Co., sewers in 4 roads. $29,139. F. Williams, Court House, engr.

O., Dayton—June 28, by G. F. Baker, dir. P. Service, sanitary sewer siphon across Miami River at Natl. Cash Register Plant, incl. valve chambers, c.i. pipe across river, fittings, etc. $30,000. J. F. Hale, city engr.

Okla., Lawton—July 9, by T. Sanders, city clk., 14,600 ft. 8 and 10 in. concrete sewers in Squak Creek Addition. $25,000. Benham Eng. Co., Perrine Bldg., Oklahoma City, engrs.

Pa., Chester—July 16, by G. J. Hunter, supt. Streets & Public Improvements, constructing Chester River Inverted Siphon. Contr. 11. R. C. Wheeler, 36 State St., Albany, N. Y., consult. engr.; adv. E. N.-R. June 27.

Pa., Greenville—See "Waste Disposal."

Tenn., Knoxville—See "Streets and Roads."

Contracts Awarded

Calif., Los Angeles—Bd. P. Wks., sanitary sewers, house connections in Barrington Ave. and Pearl St. Sewerage Dist., to Gogo & Rados, 914 Sunset Blvd., $27,288.

Calif., Los Angeles—Bd. P. Wks., sanitary sewers, house connections in Westwood Blvd. and Ohio Ave. Sewer Dist. to Mlagenovich & Gillespie, 226 North Doheny Dr., Beverly Hills, $54,597.

Ill., Chicago—Bd. Local Impvts., City Hall, tile sewers, brick manholes, catch basins in West 82nd Pl. and West 82nd St., to F. Peyrot, 4309 North Mason St.; South Bishop St., to T. Till, 5475 Hirsch St.; Hortense Ave., to S. Ryan, 2927 West Congress St.; West 71st, 82nd, South Richmond and Mozart Sts., South Francisco and South California Aves., to L. Scully, 82 West Washington St.; Strong St., North Mobile and North Merrimac Aves., to E. J. Albrecht Co., 35 South Dearborn St.; drains in West 129th Pl., West 83rd, 94th and Wallace Sts., South Kedzie, Loleta, Nora, Emerald, South Union and Lowe Aves., to A. Scully, 4504 Wrightwood Ave.; East 95th and 98th Sts., South Washtenaw, Muskogee, Manistee and Marquette Aves., to M. Murphy, 5733 South Peoria St.; Leoti, Loleta, Nora, Jeffrey, Spokane, Nokomis, Navajo, Tahoma, Hiawatha, Sioux and Ionia Aves., to N. Ranieri, 5036 Montana St. Noted May 20.

Ind., Hammond—Sewers in Wicker Park Gardens, to Brophy Constr. Co., Hammond, $25,000.

Ind., New Albany—Bd. P. Wks., trunk line sewer East End, to Christensen Bros., Urbana, Ill., $187,000. Noted May 2.

Ind., Vincennes—Bd. P. Wks., Kessinger Drain, to Keane Constr. Co., Sullivan, $25,000. Noted May 9.

Ia., Council Bluffs—Sanitary sewerage system, East Bway., to Boyne Constr. Co., 120 South Main St., Council Bluffs, $26,190.

Kan., Topeka—For 34,102 ft. 8- to 36-in. sewers in Sewer Dists. 86 and 87, to W. B. Carter, Wichita, and Tulsa, Okla., $56,188. Noted June 13.

Miss., Jackson—For 6 mi. sanitary sewers in northern part city, 1 mi. in Belhaven Heights, 0.5 mi. in West Jackson, to R. T Meyers Constr. Co., Hattiesburg, $17,000; concrete pipe, to Faulkner Concrete Pipe Co., Hattiesburg, $31,000.

Miss., Meridian—For 13,780 ft. 6- to 24-in. storm and sanitary sewers, 55 manholes, to W. S. Harris, Jr. & Co., Meridian, $19,000.

Neb., Gordon—K. H. Hull, city clk., extending 21,025 ft. 8- to 12-in. sewers, 47 manholes, 9 flush tanks, 2,700 ft. ¾ in. galvanized pipe, laid in cement mortar joints, in Sanitary Sewer Dist. 2, to J. A. Parr, Chadron, $28,253.

N. J., Hackensack—Bd. Freeholders Bergen Co., Court House, storm drains in Paterson Plank Rd., to F. Van Roden, 164 Boiling Spring Ave., East Rutherford, $19,630; in Berdan Ave., Fair Lawn, to Bergen Contg. Co., Inc., 365 Lawton Ave., Grantwood, $6,318.

N. J., Paterson—Bd. P. Wks., City Hall, 30 in. sanitary sewer along Molly Ann Brook, near Westside Park, to J. Susino Co., 37 Danford Ave., $41,230.

N. J., Verona—Bd. Freeholders Essex Co., Hall of Records, Newark, storm sewer in Grove St., Fairview and Kenwood Aves. to A. Lamdariello, 67 Glenridge Ave., Montclair, $32,227.

N. Y., Hamilton — Bd. Village Trustees, sewerage system, to De Luca Bros., Trenton Ave., Utica, $99,788. Noted June 6.

N. Y., Syracuse—Intercepting Sewer Bd., City Hall, sanitary sewer in Meadowbrook Dr., to Mondo Constr. Co., 417 South Townsend St., $24,873.

O., Akron—F. E. Swineford, Akron Airport Sewer Contr. 4, to McAlonan Bros., 506 Woodland Ave., $31,449. Est. $28,000. Noted May 30.

O., Bexley (Columbus P. O.)—Village R. W. Roderick, clk., 10,000 ft. 12- to 18-in. sanitary sewer in alley east Chelsea Ave. and in Gould Rd., to Harold M. Bright, 1554 Safford Ave., Columbus, $37,086.

O., Canton—Stark Co., sanitary sewers in Project 10, Sects. C and D, Edgefield Sanitary Sewer Dist., to Nickles Bros. Co., 1533 Tuscarawas St. E., $25,684. Est. $25,000.

O., Cleveland—Concrete sewer in Montrose Rd., to Amato Constr. Co., 3610 East 161st St., $67,880.

Okla., Seminole—Extending 10,650 ft. sewer in Clarland Terrace Addition, to Sherman Iron Wks., 18 East Main St., Oklahoma City, $26,000. Est. $27,000.

Pa., Phila. — Dpt. P. Wks., Bureau of Engineering & Surveys, A. Murdock, dir., branch sewers in Arbutus and Burnham Sts., to E. Ventresco, 6016 Ross St., $24,974; 6th and Claridge Sts., to A. Corrado, 5920 Magnolia St., $6,901 and $2,889 respectively; McKean Parkway, to A. Mattia, 748 South 10th St., $10,779, Passmore St., to V. Ventresco, 442 High St., $7,353, 3rd St., to McCoal Constr. Co., 5033 Duffield St., $4,079; 28th St., to Trio Constr. Co., 610 North 68th St., $3,034; intercepting sewer and appurtenant work in Disston St., to V. Jafolla, Penn Bldg., $15,132; churn borings, to Ridpath & Patter Co., 22nd and Cambria Sts., $375. Grand total $75,516.

Pa., Pittsburgh—City Controller, City-County Bldg., rein.-con. sewers in 33rd Street Drainage Basin on Neville and Cayuga Sts., to Dunn & Ryan Constr. Co., 3918 Swineburne St., $409,070. Est. $500,000.

Wis., Lake (St. Francis P. O.)—To Teget Constr. Co., 181 Villard Ave., Milwaukee, sewers in East Eden Pl. $672; Iowa St. $758, Metropolitan Conn., $731, Lenox St. $2,770, Taylor Ave. $581, Armour Ave. $462, Adams Ave. $2,370; to Wenzel & Henoch, 498 27th St., Milwaukee, 3rd St. $367, Logan Ave. $3,938, Pine Ave. $3,373; to Ribbens Bros., 1982 Woodburn St., Milwaukee, East Layton Ave. $27,254, Quincy Ave. $3,209. Grand total $46,484. Noted May 23.

Ont., Toronto — Concrete sewer in Queens Quay, to J. Formica, 2147 Dufferin St., $117,640.

Waste Disposal

Bids Asked

Pa., Greenville—July 12, by J. M. Hittle, borough secy., foundations and building for garbage furnace, additions to sewage disposal plant. J. N. Chester, 813 Clark Bldg., Pittsburgh, engr.; adv. E. N.-R. June 27.

Bridges

Proposed Work

California — State Hy. Comn., Sacramento, withdrew bids to have been opened June 26, steel deck truss bridge over south fork Trinity River, west of Saylor. Noted June 13.

Mass., Beverly—Essex Co., R. H. Mitchell, chn. co. com., Salem, 58 x 270 ft., concrete, steel, draw bridge over Bass River. $185,000. R. Evans, co. engr. Noted Apr. 18.

Mich., Caro — See "Excavation, Drainage, Irrigation, Levees, River and Harbor."

Mo., Fisk—State Hy. Comn., Jefferson City, rein.-con., steel bridge over St. Francis River, wooden trestle over lowlands. $250,000.

Mo., Poplar Bluff—State Hy. Comn., Jefferson City, rein.-con. viaduct over Missouri Pacific and St. Louis, San Francisco tracks in southern part of city. $150,000.

Neb., Omaha—Union Pacific R.R. Co., G. J. Adamson, ch. engr., Omaha, and Chicago, Burlington & Quincy R.R. Co., F. T. Darrow, asst. ch. engr., Lincoln, preliminary plans rein.-con. bridge over Creighton Blvd. at 27th St. $275,000. City pays $50,000 of cost.

New York—See "Vermont."

Pa., Harrisburg—State Dpt. Property & Supplies, bids probably early in fall, viaduct and bridge addition. $900,000. Gehron & Ross, 101 Park Ave., New York, archts.

Pa., Morrisville—Borough of Morrisville and Bucks Co. (Doylestown), replacing timber bridge with concrete, steel bridge over canal. $31,895.

Constr. News page 378

The Invisible Superintendent at the Mortar Box *Assures Plastic Mortar*

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The plasticity of BRIXMENT *is especially valuable in laying up soldier courses and arches and in setting tile and blocks, because of the long cross-joint used in such work.*

Bridges (Continued)

Tex., San Antonio—City, c/o C. M. Chambers, mayor, takes bids after July 1, 70 ft. long, 42 ft. wide, rein.-con. and stone, pedestrian and vehicular bridge over San Antonio River at Richmond St. $28,000. I. Ewig, city engr. Noted Apr. 4.

Vermont and New York—Gulf Coast Properties, Jacksonville, Fla., sketches bridge between Alburgh, Vt., and Rouses Pt., N. Y. Fay, Spofford & Thorndike, 44 School St., Boston, Mass., engrs.

W. Va., Charleston—See "Streets and Roads under Contracts Awarded."

Ont., Mimico — Dpt. P. Hys., Parliament Bldgs., Toronto, A. A. Smith, ch. engr., 150 ft. concrete or concrete, steel bridge, 60 ft. over Mimico Creek, on Toronto-Hamilton Hy. $150,000.

Bids Asked

California—July 10, by State Hy. Comn., Sacramento, two 38 ft. span rein.-con. girder bridge over Arcade Creek, 11 mi. east of Sacramento, Sacramento Co.; three 35 ft. span rein.-con. girder bridge over Graves Creek, 2 mi. south of Templeton, San Luis Obispo Co. C. H. Purcell, Sacramento, engr. This corrects report in June 20 issue.

Calif., Yreka—July 17, by State Hy. Comn., Sacramento, two 47 ft. 6 in. and three 60 ft. rein.-con. girder span bridge on concrete piers, abutments over Shasta River, 5 mi. north of here, Siskiyou Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Conn., Bristol—July 2, by City, Street Com., City Hall, 2 concrete bridges over Pequabuck River, 1 at East St. and other at Stevens St. $25,000. C. W. Buell, 175 Main St., engr.

Florida—July 23, by State Road Dpt., R. W. Bentley, chn., Tallahassee, 423 ft. steel, concrete bridge, Rd. 5, F.A. Project 65, Hillsboro Co.—199 ft. bridge, Rd. 4, F. A. Project 68-1, Palm Beach Co.—bridge over Middle River, Rd. 4, F.A. Project 68-4, and bridge over Himmarshee Canal, F. A. Project 68-5, Broward Co.—bridge over New River, Rd. 28, Project 715-B, Union and Bradford Counties. J. L. Cresap, state hy. engr.

Florida—July 24, by State Road Dpt., R. W. Bentley, chn., Tallahassee, bridge over Hillsboro River, Rd. 4, F. A. Project 68-2, bridge over Pompano Canal, F. A. Project 68-3, and bridge over Tarpon River, F. A. Project 68-6, Broward Co.—bridge over Rice Creek, Rd. 3, Project 721-B, Putnam Co.—bridge over Withlacoochee River, Rd. 5, Project 835, Marion and Citrus Counties. J. L. Cresap, state hy. engr.

Ia., Atlantic—July 8, at office Auditor Cass Co., three 122 ft. 5 x 16 ft. high truss spans, one 108 x 18 ft. pony truss span, bridges, also 1,800 steel snow fence posts. G. Canon, Atlantic, engr.

Ia., Sidney—July 2, at office Auditor Fremont Co., two 144 ft. steel truss bridge with 40 ft. I-beam approaches, concrete floor and piers, one 126 ft. steel truss bridge with 40 ft. I-beam approaches, concrete floor and piers. R. H. Greenwood, Sidney, co. engr.

Ia., Winterset — July 9, at office Auditor Madison Co., continuance deck girder bridge, incl. one 70 x 20 ft. and two 38 x 20 ft. spans, at Devils Backbone State Park. T. S. Ferguson, Winterset, co. engr.

Mass., Boston—July 9, by Dpt. P. Wks., concrete and steel bridge over Midland Division of New York, New Haven & Hartford R.R. tracks, River St. $90,000. J. H. Sullivan, comr.

Miss., Vicksburg—July 2, by Bd. Supervs. Warren Co., bridge on Vicksburg-Pt. Gibson Hy., Federal Aid Project 0201-B, 1,264 cu.yd. concrete, 134,810 lb. reinforcing, 476,000 lb. structural steel, 3,112 ft. concrete railing; also removing present bridge. G. A. Draper, c/o State Hy. Dpt., Jackson, engr.

New Jersey — July 8, by State Hy. Comn., Trenton, 5 bridges on Route 29, Sect. 7, between Raritan and Chimney Rock. A. L. Grover, ch. clk.

N. Y., Yonkers — July 9, by Westchester County Park Comn., J. Downer, ch. engr., 72 West Pondfield Rd., Bronxville, Kimball Avenue Bridge, Contr. 233; adv. E. N.-R. June 27.

Oklahoma—July 2, by State Hy. Dpt., Oklahoma City, 3 span 180 ft. steel truss and I-beam bridge at Smithville, $30,00—5 span 94 ft. rein.-con. bridge at Bethel, $25,000, both McCurtain Co. J. Rightmire, acting hy. engr.

Okla., Lenora—July 2, by W. Espey, clk. Dewey Co., 1 span 1,800 ft. overflow concrete bridge, $25,000.

Pa., Bridgeville—July 2, by Comrs. Allegheny Co., Court House, Pittsburgh, Bridge 12 over Charters Creek, $65,000. V. R. Covell, 519 Smithfield St., Pittsburgh, co. engr.

Vermont—June 28, by State Hy. Dpt., Montpelier, 180 ft. steel truss span bridge in Jamaica, and 122 ft. steel truss span bridge, Warren.

Vermont—June 29, by Bd. Selectmen, rein.-con. bridge between Fairfield and East Fairfield, $25,000.

Washington—July 9, by State Hy. Comn., Olympia, 3 rein.-con. Tee-beam bridge 1 each over Mill, Germany, Abernethy Creeks, State Rd. 12, F.A.P. 167-D, Cowlitz Co.—5 timber bridges on same road, S. J. Humes, state hy. engr.

Wash., Seattle—See Streets and Roads."

Contracts Awarded

Alabama—State Hy. Dpt., Montgomery, several small concrete bridges, culverts, on hy. in Mobile and Washington Counties, to E. S. and W. C. Linch, Wetumpka, $8,570—Escambia Co., to C. K. Armes, Greenville, $22,867—Hale Co., to W. O. Farrior, Ft. Deposit, $5,909—Escambia Co., to S. P. Cook, Fairmont, Ga., $63,308—in Bibb Co., to J. T. McLemore, Eutaw, $19,164—Marion Co., to L. C. Britton, Jasper, $10,351—25 ft. concrete extension to Martin Creek Bridge, Barbour Co., to Chapman & Brown, Montgomery, $3,896—concrete bridge, foundation Marshall Co., to C. B. Cox, Clanton, $2,617. Grand total $136,682. Noted May 30.

Calif., Oroville—State Hy. Comn., Sacramento, rein.-con. arch type bridge over Western Pacific R.R. and Feather River, 4 mi. east of here, to P. M. White, 728 21st Pl., Santa Monica, $169,947.

Ind., Indianapolis—See "Streets and Roads."

Iowa—State Hy. Comn., Ames, bridges, culverts in Buchanan Co., to J. B. Elliott, Independence, $2,780—Clinton Co., to L. Plumb, Wapello, $1,600—Montgomery Co., to Lundgren-Reis, 125 College St., Des Moines, $28,498—Pottawattamie Co., to Wickham Bridge & Pipe Co., Council Bluffs, $35,678—Winneshiek Co., to Ward Constr. Co., Decorah, $10,200—Harrison and Story Counties, to B. Cole & Son, Ames, $84,500 and $12,346 respectively—Jackson Co., to A. Olson Constr. Co., Waterloo, $13,839. Grand total $189,441. Noted June 13.

Kansas—State Hy. Dept., Topeka, twelve 30 ft. span deck girder bridge in Graham Co., to Young & Hill, Maywood, Neb., $31,703.

Maryland — State Road Comn., Baltimore, double span rein.-con. girder bridge over Jennings Run, Contr. A-58, Allegany Co., to Allied Pneumatic Services, Inc., Lenox Bldg., Wash., D. C., $12,838. Noted May 30.

Mich., Coloma—Berrien Co. Rd. Comn., 70 ft. steel superstructure bridge over Paw Paw River, to W. J. Cleary, Benton Harbor, $25,000.

Minn., St. Paul—Northern Pacific Ry. Co., B. Bluhm, ch. engr., Ry. Exch. Bldg., concrete, steel bridge, Maryland St., to E. J. Dunnigan, 1012 Builders Exch. Est. $35,000. Noted Feb. 28.

Mont., Missoula—Northern Pacific Ry. Co., B. Bluhm, ch. engr., Ry. Exch. Bldg., St. Paul, Minn., steel bridge over Missouri River on Bitter Root Valley Branch, to Peppard & Fulton, 1004 Roanoke Bldg., Minneapolis, Minn. Est. $70,000. Noted Feb. 21.

New York—A. W. Brandt, comr. Hys., Albany, 3 bridges in Schenectady and Schoharie Counties, to H. C. Toaspern & Co., Middletown, $179,169. Est. $164,795. Noted June 13.

N. Y., Rome—Concrete arch bridge across Mohawk River, East Dominick St., to H. R. Beebes, Inc., 404 Court St., Utica, $58,200. Noted May 30.

Okla., Flint—State Hy. Dept., Oklahoma City, repairing, reflooring Grand River Bridge, near here, Delaware Co., to Gaines & Yoekum, 519½ West Main St., Oklahoma City, $27,773. Est. $32,000.

Pa., Bell Vernon—Pittsburgh & West Virginia R.R., Pittsburgh, substructure for 2,750 ft. bridge over Monongahela River, to Lang Constr. Co., Pittsburgh; superstructure, approaches, incl. 6,850 tons steel, to American Bridge Co., Frick Bldg., Pittsburgh. Est. $1,000,000.

Tennessee—State Dpt. Hys. & P. Wks., Nashville, bridges in Crockett Co., to W. A. Patton, South Pittsburg, $27,633 — Henry Co., to M. C. Merrills, Belleville, Ill., $43,292—Obion Co., to Peterson & Earnhart, Montgomery, Ala., $32,643—Sullivan Co., to R. H. H. Blackwell, Cleveland, $150,884 — Shelby Co., to F. V. Ragsdale Co., Dermon Bldg., Memphis, $44,960. Grand total $299,532.

Tennessee—State Dpt. Hys. & P. Wks., Nashville, steel, concrete bridge over Little Soney Creek, Carter Co., to Young & Lyons, Rogersville, $27,542. Noted May 9.

Vermont—State Hy. Com., bridges in Waterford, to Engineering Serv. & Constr. Co., 220 Devonshire St., Boston, Mass., $16,980; Rochester, to Gordon & Sutton, North Adams, Mass., $57,223.

Wash., Port Angeles—Comrs. Clallam Co., 125 ft. steel bridge over Sekiu River, to Puget Sound Bridge & Dredging Co., Central Bldg., Seattle, $21,996.

Wash., Tacoma—State Hy. Comn., Olympia, 350 ft. bridge on Tacoma Ave., Pierce Co., incl. 150,000 lb. reinforcing, 1,151,000 lb. structural steel, 15,000 lb. steel castings, to Lindstrom & Feigenson, 230 Worcester Bldg., Portland, Ore., $139,610. Noted May 30 under "Streets and Roads, Washington."

Dams

Proposed Work

Wash., Seattle—City Council raising old crib dam, 2 ft., now serving power plant. $25,000.

Bids Asked

N. Y., Salamanca—July 18, by D. H. Ames, secy., Allegany State Park Comn., Administration Bldg., Red House, constructing dam and lake at Allegany State Park, near here; adv. E. N.-R. June 27.

Contracts Awarded

Calif., Stockton—A. L. Banks, city clk., 144 ft. high gravity type flood control dam 3½ mi. south of Valley Springs, Calaveras Co., to Bent Bros., 418 Pecan St., Los Angeles, $838,715. Noted May 23.

Railways

Proposed Work

Texas—Ft. Worth & Denver City Ry., R. C. Gowdy, ch. engr., Denver, Colo., 110 mi. standard gage railroad from Childress to Pampa, incl. grading, bridging. $4,000,000. This corrects report in June 13 issue.

Bids Asked

New Mexico—July 5, by G. T. Kearns, vice-pres. San Luis Valley Ry. Co., at San Acacio, Colo., 18.5 mi. railroad between Jaroso, Colo., and Questa, N. M., incl. grading, bridging, track, ballasting, depot buildings, water tanks, wells, pumping plant, engine house. (work entirely in New Mexico).

Contracts Awarded

Arkansas—See "Unclassified under Camden, Ark."

Airports

Proposed Work

Mich., Detroit—Supervs. Wayne Co., County Bldg., 1 and 2 story, 125 x 400 ft., rein.-con., brick, steel hangar, plain found., Goddard and Middle Belt Rds. $325,000. Wayne Co. Road Comn., LeRoy C. Smith, Barium Bldg., engr.

Que., Montreal—Harbor Comrs. airport, east end of harbor. $300,000. Private plans.

Bids Asked

Pa., Pittsburgh—July 2, by R. G. Woodside, controller Allegheny Co., Court House, grading, draining 436 acres for municipal and county airport on Lebanon Church Rd., near here, $1,900,000. County Bureau Aviation, 579 Smithfield St., engrs. Noted June 20.

Contracts Awarded

Mo., Bridgeton—B. R. Kinsey, pres. Bd. P. Serv., City Hall, St. Louis, grading eastern portion flying field, to Cameron, Joyce, Smith & Elder Co., Keokuk, Ia., $111,190; diverting Cold Water Creek from field, to R. J. Blackburn Co., 5700 Eichelberger St., $104,598. Noted June 6.

Excavation, Drainage, Irrigation, Levees, River and Harbor

Proposed Work

California—State Dpt. Water Rights, Sacramento, granted permit to J. M. & J. H. Kile, Stockton, to divert 9.3 cfs from Mokelumne River, San Joaquin Co., for irrigation, $17,500.

Mich., Caro — Huron and Tuscola Counties, c/o Francis Eng. Co., engrs., Saginaw, dredging 43 mi. Sebewaing River Drain and branches; rebuilding 70 small bridges. $478,000.

N. J., Alpine — Palisades Interstate Park Comn., E. W. King, dir., Englewood Cliffs, 200 x 800 ft. boat basin, timber, rein.-con. bulkheads, winter storage facilities, on Hudson River. $50,000. Private plans.

O., Cleveland — Concrete retaining wall in Doan Brook. $75,000. T. Joyce, 437 City Hall, engr.

Canada — Dominion Govt., Ottawa, Ont., dredging Bying Inlet $30,000, Cataraque Bay, Kingston $50,000, Mitchells Bay $30,000, Parry Sound $18,500, improving harbor, Oshawa $50,000, Port Hope $37,000, Port Stanley $30,000, new departmental building $2,500,000, all in Ontario; extending breakwater, Brooklyn, N. S., $25,000; improving harbor, Donnacona $50,000, Sorel $250,000 wharf and dredging, Mauicouagon River $50,000, reconstructing wharf, Ste. Irenee $43,000, all in Quebec; telegraph and telephone lines in Lower St. Lawrence and Maritime Provinces, Cable Ship, $100,000; installing telephone circuit between Lillooct and Lytton, British Columbia, $6,300.

Que., Huntington—City, T. W. Furey, clk., drainage canal. $200,000.

Bids Asked

Calif., Westley—July 6, by E. Smith, secy., West Stanislaus Irrigation Dist., 300,000 sq.ft. concrete lateral ditch lining, Contr. 22; 2,500 lb. ¼ in. to ¾ in. rock, and 2,500 tons sand f.o.b. Westley, Contr. 23.

N. Y., Brooklyn—July 1, by W. C. Martin, supt. School Buildings, Flatbush Ave. extension and Concord St., culvert, fill, adjoining site Abraham Lincoln High School, Ocean Parkway, and Guider Ave., for Bd. Educ., 500 Park Ave., New York.

Wash., Seattle—See "Streets and Roads."

Ont., Kingston — Dpt. P. Wks., Parliament Bldgs., Ottawa, K. M. Cameron, ch. engr., taking bids dredging Cataraqui Bay. $50,000.

Ont., Riverside — July 2, by C. J. McHugh, town clk., 4,600 ft. concrete on pile found. or wood sheet pile breakwater. $40,000. G. G. Reid, Riverside, engr.

Constr. News page 379

Excavation, Drainage, Irrigation, Levees, River and Harbor (Continued)

Contracts Awarded

Mass., Oak Bluffs—Commonwealth of Massachusetts, Dpt. P. Wks., Boston, creosoted timber bulkheads, jetties, to C. W. Blakeslee & Son, Inc., 58 Waverly St., New Haven, Conn., $47,050. Noted May 16.

Minn., Winona—A. Baeuerlen, aud., Winona Co., flood control ditch, incl. 96,264 cu.yd. excav., concrete dam, 3 wooden flood control dams, to Lee Sadler, Judson. Est. $16,824. Noted May 23.

Mississippi—Coahoma and Quitman Counties, clearing 3.5 mi. right-of-way, and 117,000 cu.yd. earth excav., to G. W. Funk, Shelby, at $0.12 per cu.yd. E. L. Fontaine, Clarksdale, engr.

Mo., Warrensburg—Johnson Co., c/o O. W. Greer, clk., cleaning 10,000 cu.yd. constructing 13,000 cu.yd. new work on Lateral D-Prime, for Big Creek D.D. 1 and 2, c/o T. P. French, overseer, Latour, to Wills Constr. Co., 6029 Clemons Ave., St. Louis. Noted May 30.

Que., Chateauguay — Twp. Council, J. A. Potvin, Ste. Martine, secy., dredging Norton Creek, to Natl. Dock & Dredging Co. Ltd., 23 de Varennes St., Quebec City, $50,000.

Streets and Roads

Bids Asked

California—July 10, by State Hy. Comn., Sacramento, grading, untreated crushed gravel or stone surfacing 1.2 mi. Sacramento Co.—untreataed crushed gravel or stone surfacing and gravel or stone screenings to be stock piled 19.4 mi. Lassen Co.—grading, asphaltic concrete paving 10.3 mi. Monterey Co. C. H. Purcell, Sacramento, engr. This corrects report in June 20 issue.

California — July 17, by State Hy. Comn., Sacramento, grading, asphaltic concrete paving 8.7 mi. Alameda Co.—stock-piling crushed gravel or stone on 13.8 mi. road between La Honda Rd. and Saratoga Gap, San Mateo, Santa Clara and Santa Cruz Counties — bituminous surface treating 6.9 mi. Nevada and Placer Counties. C. H. Purcell, Sacramento, engr.

Calif., Oroville — Bids about July 15, widening Robinson, Downer and Montgomery Sts. $60,000. H. H. Hume, city mgr.

Calif., San Diego—July 8, by Common Council, grading, curbing, sewers, 6 in. concrete paving 279,877 sq.ft. 54th St. H. W. Jorgensen, city engr.

Colorado—July 3, by State Hy. Dpt., Denver, grading, graveling surfacing 3.133 mi. Grand Co. L. D. Blauvelt, Denver, engr.

Colo., Denver—July 1, by Dpt. Impvts. & Parks, sidewalks in Washington Park Sidewalk Dist. 4, $34,717—asphaltic concrete paving Park Hill Paving Dist. 5—curbing, grading, surfacing South Denver Impvt. Dist. 28, $44,007. A. K. Vickery, City Hall, engr. Noted Apr. 4.

Connecticut — July 1, by J. A. Macdonald, state hy. comr., Hartford, rein.-con. paving 23,456 ft. hy. in Bolton, Manchester and Plainville—trap rock waterbound macadam paving 22,879 ft. Salisbury—waterbound macadam paving 24,332 ft. Warren and Wilton—crushed gravel paving 5,292 ft. Hartland—bituminous macadam paving 603 ft. and constructing concrete encased bridge, Coventry and Mansfield—75 ft. steel truss superstructure for bridge Washington; adv. E. N.-R. June 27.

Conn., Bridgeport — City taking bids 3 in. sheet asphalt, warrenite and penetration paving Calhoun Pl., Seeley, Clarkson, Taft, Wood, Aidine, Calhoun, Rusling, Capital, Overland, Cole, Dover, Union, Kent, Pixlee, Hickory, Stillman, Booth Sts. $150,000. J. A. McElroy, City Hall, engr.

Florida—July 23, by State Road Dpt., R. W. Bentley, chn., Tallahassee, alternate types paving 9.609 mi. Rd. 17, F. A. Project 64-A, and 9.61 mi. Rd. 17, F. A. Project 64-C, Hillsboro Co.—concrete paving 11.76 mi. Rd. 10, Project 728, Leon Co.—single bituminous on Florida lime rock paving 5.05 mi. Rd. 10, Project 644-C, Wakulla Co.—3 mi. Rd. 27, Project 669-Y, Collier Co.—6.03 mi. Rd. 2, Project 695, Lake Co.—7.65 mi. Rd. 13, Project 742, Alachua Co. Co. J. L. Cresap, state hy. engr.

Ga., Dalton—July 1, by G. W. Keisler, city clk., City Hall, grading, curbing, concrete paving 6,200 sq.yd. Walnut Ave. K. I. Thomas, McGlawn-Bowen Bldg., Atlanta, engr.

Idaho—July 2, by J. D. Wood, comr. State Dpt. P. Wks., Boise, grading 56,000 cu.yd. crushed graveling 28,500 cu.yd. Roosevelt Hy. between Antelope Springs and Granite Creek, P. B. Wilson, Pocatello, resident engr.

Ill., Ellsworth—July 8, by O. Sutton, hy. comr. McLean Co., graveling 30 mi. Dawson Twp. Rds., incl. 30,000 cu.yd. gravel. $30,000. Noted June 6.

Ind., Crown Point—July 15, by Bd. Comrs. Lake Co., grading, drainage, paving Frank Fronek et al. road, $41,900—Henry P. Kussnaul et al. road, $33,000. W. E. Whitaker, co. aud.

Constr. News page 380

Ind., Evansville — July 11, by Bd. Comrs. Vanderburg Co., c/o T. W. McCutchan, guttering, bituminous macadam paving 8,898 lin.ft. Buchanan Rd., 18 ft. $66,645. R. W. Meisinger, Court House, engr.

Ind., Indianapolis—July 3, by Bd. Comrs. Marion Co., constructing 3.02 mi. College Ave. $91,265. H. Dunn, aud. Noted June 13.

Ind., Lafayette—July 3, by Comrs. Tippecanoe Co., constructing Francis M. Buskirk et al. Rd. $30,000. C. M. Davis, co. aud.

Ind., New Albany—July 13, by Bd. Comrs. Floyd Co., grading, paving 26,625 ft. Budd Rd. $35,000. W. G. Dieckmann, co. aud.

Ind., Terre Haute—July 8, by Bd. Comrs. Vigo Co., grading, brick paving Louis Seitz et al Rd. $41,140. C. C. Pinson, co. aud.

Ind., Versailles—July 8, by Bd. Comrs., Ripley Co., constructing C. W. Peck et al. road. $28,940.

Ind., Warsaw—July 6, by Bd. Comrs. Kosciusko Co., grading, graveling or macadamizing 4.003 mi. Jacob Kern county unit, Franklin Twp. $26,875. H. Breading, co. aud. Noted June 20.

Iowa—July 1, by State Hy. Comn., at office M. A. Varley, maintenance supt., Ft. Dodge, improving roads in Humboldt Co., 2,400 cu.yd. crushed gravel 1 mi. haul, 20,400 units overhaul, 1,000 cu.yd. stripping—roads in Webster Co., 13,550 cu.yd. gravel, 107,025 units overhaul, 1,000 cu.yd. stripping.

Iowa—July 3, by State Hy. Comn., at office R. S. Mushrush, maintenance supt., at Storm Lake, maintenance graveling roads in Sac Co., 2,050 cu.yd. screen gravel 1 mi. haul, 11,525 units overhaul, 700 cu.yd. stripping—roads in Pocahontas Co., 5,400 cu.yd. screen gravel 1 mi. haul, 33,300 units overhaul, 1,600 cu.yd. stripping.

Ia., Iowa City—July 1, by G. J. Dahrer, city clk., grading, curbing, guttering, brick, asphalt or concrete paving 8,530 sq.yd. Mogowan and Ginter Aves., Lucus, Rundell, Lowell, Pickard and Yewell Sts. $42,000 (on brick). A. Wallen, City Hall, engr.

Ia., Keokuk—July 2, by H. B. Blood, city clk., grading, various types paving 15,669 sq.yd. I. Park, North and South 6th, South 16th, Palean Sts. $42,116. Brown & Cook, 108 North Market St., Ottumwa, engrs.

Ia., Sioux City—July 5, by F. Thompson, city clk., curbing, concrete paving 18,420 sq.yd. Grandview Blvd., Victoria Court, Meadow Lane, Kings Hy., South Martha, South Lemon, Jones, 25th and Clark Sts. G. Hintgen, City Hall, engr.

Kansas — July 3, by State Hy. Comn., Wamego, concrete surfacing 9.096 mi. U. S. Rd. 73-E. Federal Aid Project 376 and grading, curbing, culverts, flumes, fine grading, concrete paving 98,283 sq.yd. same road. Sect. D, latter road exceeds $25,000. W. W. Buck, Topeka, hy. engr.

Maryland—July 2, by State Roads Comn., Baltimore, graveling 4 mi. Contr. P-94, Prince George Co.—0.75 mi. Contr. Sm-54, St. Marys Co.—concrete paving 3.2 mi. Contr. M-123, Montgomery Co.—3.3 mi. Contr. K-36, Kent Co. H. Williar, Jr., Garrett Bldg., Baltimore, engr.; adv. E. N.-R. June 27.

Md., Baltimore—July 2, by Bd. Awards, concrete paving 9,800 sq.yd. alleys in Alley Contr. 135; 20,000 sq.yd. footways in Footway Contr. 114. N. L. Smith, hys. engr.

Massachusetts—July 2, by Dpt. P. Wks., bituminous macadam paving 12,712 ft. highway in Sherborn, Stoneham, Wakefield, and Saugus —gravel and bituminous macadam paving 4,100 ft. Brimfield—bitulithic concrete paving 8,800 ft. West Tisbury and Yarmouth. A. W. Dean, engr.

Mass., Boston—July 3, by Park Dpt., 33 Beacon St., sheet asphalt or bitulithic paving section Commonwealth Ave., $25,000. J. H. Sullivan, comr.

Mass., Boston—July 8, by Dpt. P. Wks., sheet asphalt paving in Wards 17 and 4 and Boston Proper. $25,000 or more. J. H. Sullivan, comr.

Mass., Medford (br. Boston)—July 1, at office of Mayor, 10 High St., sheet asphalt or bituminous macadam paving streets. Est. exceeds $25,000. E. A. Gaffey, comr.

Mass., Medford (br. Boston)—See "Contracts Awarded."

Miss., Canton—July 1, by Bd. Superv. Madison Co., improving 1.499 mi. Federal Aid Project 13, Flora-Bentobia Hy., 96,000 cu.yd. excav., 105,945 ft. creosoted, 4,170 ft. untreated lumber, 5,410 ft. creosoted piling. G. A. Draper, c/o State Hy. Dpt., Jackson, engr.

Miss., Laurel—July 3, by Bd. Supervs. Jones Co., graveling 7.9 mi. Leaf-Ellisville Hy., 4.58 mi. Ellisville-Collins Hy., 11.58 mi. Laurel-Taylorsville Hy., each 12 ft. wide.

Miss., McComb—July 16, by Mayor, various types paving 5,000 sq.yd. Northwest Ave., Project 7. H. A. Mentz, Hammond, La., engr.

Miss., Sardis — July 1, by Bd. Supervs. Panola Co., 6 in. graveling 4 mi. Old Panola Hy., 12 ft.

Mo., Clayton—July 3, by Clerk St. Louis Co., Court House, grading, rein.-con paving Laclede Station Rd. between southern limits of Webster Groves and Gravois Rd.; 50 ft. rein.-con. bridge over Cold Water Creek at Halls Ferry Rd. R. Jablonsky, Court House, engr.

Mo., St. Louis—July 9, by Bd. P. Serv., City Hall, grading, concrete paving 15,630 sq.yd. alleys in City Blocks 1582, 1496-N, 1905, 2758, 2864, 3388, 4074, 4076, 4520, 807, 878, 989, 1863, 1898. $44,540. W. W. Horner, city engr. Noted Apr. 25.

Mo., Sikeston—July 1, by P. H. Stevenson, city clk., grading, 7 in. rein.-con. paving 8,120 sq.yd. New Madrid and North Kingshighway Sts. W. A. Fuller Co., 2916 Shenandoah Ave., St. Louis, engrs.

Neb., Ralston—July 3, by City Clerk, paving 26 blocks. $50,000. Henningson Engr. Co., National Bldg., Omaha, engr.

New Hampshire—July 5, by State Hy. Dpt., Concord, 6 in. one course rein.-con. on 8 in. gravel paving 31,777 sq.yd. Daniel Webster Hy., Plymouth, $160,000; 11,591 sq.yd. same road in Boscawen, $52,000.

New Jersey—July 8, by State Hy. Comn., Trenton, 9 in. rein.-con. paving 81,542 sq.yd. Route 29, Sect. 8, Chimney Rock to Washington Ave., Somerset Co. A. L. Gruver, ch. clk.

N. J., Jersey City—July 2, by Bd. City Comrs., City Hall, grading, sheet asphalt on concrete paving Stagg St. and Communipaw Ave. $75,000. C. A. Van Keuren, city engr. Noted May 23.

N. J., Metuchen—July 5, by Bd. Chosen Freeholders, County Record Bldg., New Brunswick, rein.-con. paving 13,632 ft. Perth Amboy and Metuchen Rd. $25,000. W. F. Buchanan, 125 South St., Perth Amboy, co. engr.

N. J., Plainfield—July 1, by Common Council, City Hall, guttering, curbing, 7 in. bituminous macadam paving 11,000 sq.yd. Kenyon Ave. $60,000. A. Vars, city engr. Noted May 23.

N. Y., Brooklyn—July 2, by Park Bd., W. R. Herrick, pres. Park Dpt., Arsenal Bldg., Central Park, New York, improving Lincoln Rd. from Ocean to Bedford Aves.—cement walks in Linton Park, Bradford St., Blake, Miller, and Dumont Aves.—improving Playground 7, East 13th St. and Avenue S., for Bd. Educ., 500 Park Ave., New York.

N. Y., Buffalo—July 5, by G. Fisk, comr. P. Wks., Municipal Bldg., paving Indian Orchard Pl., McKinley Parkway, Hopkins St., Auburn Ave., N. repaving Oakhurst Ave., Norman, Cayuga, Maurice Sts. C. E. P. Babcock, city engr.

N. Y., Cheektowaga (mail Depew)—July 1, by A. Schiesel, Town Hall, Forks, grading, rein.-con. paving Woodridge Ave., Midland Dr., Eastland Parkway, Rosewood and Westland Terraces, Grand, East Grand and West Grand Blvds.

N. Y., New York—July 2, by J. Miller, pres. Manhattan Boro, Municipal Bldg., grading granite block on concrete repaving Platt and Marginal Sts.; grading, curbing, sidewalks, asphalt block on concrete paving Ellwood and West 186th Sts.

N. Y., New York—July 2, by Park Bd., W. R. Herrick, pres. Park Dpt., Arsenal Bldg., Central Park, heavy traffic sheet asphalt on concrete paving portions along south driveway, Bronx and Pelham Parkway, Bronx Boro.

N. Y., South Yonkers (sta. Yonkers)—July 5, by Westchester Co. Sanitary Sewer Comn., 192 Martine Ave., White Plains, 1/5 mi. gravel or waterbound macadam paving, and underlying, 4 ft. Class A c.i. sewer, conduits and pipes with connections and appurtenances.

O., Akron—July 15, by F. E. Swinsford, dir. P. Serv., stone curbing, vitr. brick paving 3,250 sq.yd. Greenwood Ave., $19,000—2,900 sq.yd. Patterson Ave., $16,400—10,600 sq.yd. Talbot Ave. $72,000. E. A. Kemmler, Municipal Bldg., engr.

Oklahoma—July 2, by State Hy. Dpt., Oklahoma City, grading 6 mi. State Hy. 9, Grady Co. $25,000—5.74 mi. State Hy. 9, McLean Co. $25,000—7.94 mi. State Hy. 33, Payne Co. $45,000—7.07 mi. State Hy. 40, Payne Co. $35,000—11.1 mi. U. S. Hy. 73, Pittsburg Co. $60,000. J. Rightmire, acting hy. engr.

Okla., Altus—July 2, by J. M. McKinley, city clk., grading, concrete paving 8,800 sq.yd. North Commerce Ave. $25,000. Peckham & Riggins, 603½ West Main St., Oklahoma City, engrs.

Okla., Enid—July 1, by L. Piegleman, city clk., grading, concrete paving 9,300 sq.yd. West Chestnut St. $27,000. F. C. Magruder, Enid, engr.

Okla., Oklahoma City—July 9, by M. Peshek, city clk., grading, curbing, sheet asphalt paving 9,000 sq.yd. North Bway. $46,600. W. W. Small, City Hall, engr.

Pa., Ambridge — July 1, by Boro, A. W. Johns, mgr., grading, curbing, concrete paving 1,820 sq.yd. 11th St., Contr. 1—grading, concrete curbing, guttering 2,000 ft. 13th St., Contr. 2—resurfacing 2,900 sq.yd. 1st St., Contr. 3—storm sewers in 11th St., Contr. 4.

Pa., Phila.—July 2, by Dpt. P. Wks., Bureau of Hys., A. Murdock, dir., Schedule A, grading Temple, Eastwick, 56th, 57th, 61st Sts.—Schedule B asphalt paving (assessment work) Boyer, Hegerman, Locust, Wanamaker Sts.—Schedule C, resurfacing asphalt streets, brick or other block streets by heater method Groups 1 and 2—Schedule D, redressed granite block repaving Franklin, 4th, 9th, 17th Sts.—Schedule E, repaving certain intersections with smooth dressed and redressed granite blocks Germantown, 7th, 10th, 11th, 13th, 16th, 18th, 19th, 20th, 22nd Sts.—Schedule F, sheet asphalt paving Walnut Street Bridge over Schuylkill River. Former bids withdrawn. Noted June 20.

Pa., Pittsburgh—See "Airports."

Streets and Roads (Continued)

Pa., Pittsburgh—July 2, by R. G. Woodside, controller Allegheny Co., Court House, brick on concrete paving 21,296 ft. Ohio River Blvd., $1,500,000—asphaltic concrete on broken stone paving 4,640 ft. Braddock-Wexeford Run Rd. Contr. 2, near here, $30,000—eliminating curves, rein.-con. paving 5,912 ft. Babcock Blvd., $38,000—rein.-con. paving 13,104 ft. Mowery Gill Hall-Cochran Mills Rd., Option, $182,900.

Pa., Washington—July 3, by T. J. Underwood, controller Washington Co., rein.-con. paving 4,165 ft. Canonsburg-Thomas Rd., Sect. 5—000 ft. Monongahela-Donora Rd.—6,730 ft. Meadowlands-Houston Rd.—constructing Donehoo Bridge, 76 ft. long, Cross Creek 17, Chaney Eng. Co., co. engrs.

Tenn., Knoxville—July 1, by H. J. Wight, city mgr., curbing, sewers, sheet asphalt paving 10,000 sq.yd., concrete paving 43,000 sq.yd., asphaltic concrete paving 33,000 sq.yd.

Washington—July 16, by S. J. Humes, dir. State Hy. Comm., Olympia, (**S.R. means State Road**), bituminous treated surfacing 36 mi. S.R. 10, Chelan Co.—32.6 mi. same road Okanogan Co.—concrete paving 0.4 mi. S.R. 9, Clallam Co.—crushed stone surfacing 25.100 cu.yd. S.R. 10, Okanogan Co.—grading 792,140 cu.yd., crushed stone surfacing 54,880 cu.yd. S.R. 5, Pierce and Yakima Counties.

Wash., Seattle—July 8, by Comrs. King Co., reconstructing and constructing 5.75 mi. Fall City-Tolt Hy., incl. 53,400 cu.yd. borrow, 1,333 ft. trestle, $74,000. T. Hunt, Seattle, co. engr.

W. Va., Beckley—July 10, by Raleigh Co., Court, roads in Trap Hill Dist. H. M. Scott, co. road engr. Noted June 20.

Que., St. Hubert—July 5, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., grading, bituminous paving roadways, Montreal Air Harbour, $75,000.

Contracts Awarded

Ala., Bessemer—For 2 in. asphalt on 5 in. concrete paving 6 blocks 7th Ave., to Long & Hagerty, American-Traders Bldg., Birmingham, $25,250. Est. $26,100.

Ark., Batesville—Grading, curbing, concrete paving 12,000 sq.yd. Street Impvt. Dist. 6, to Hogan Constr. Co., Home Insurance Bldg., Little Rock, $27,758. Noted May 23.

Ark., Hope—Paving 50 blocks, to S. Constance Co., Hope, $130,000.

California—State Hy. Dpt. Sacramento, grading, concrete paving 1.09 mi. road between Cuesta and Santa Margarita, San Luis Obispo Co., to M. J. Bevanda, Stockton, $98,460. Noted May 9.

California—State Hy. Comn., at Los Angeles, grading, concrete paving 4.9 mi. hy. between Santa Ana and Anaheim, Orange Co., to Griffith Co., Los Angeles Railway Bldg., Los Angeles, $184,301. Noted May 16.

California — State Hy. Comn., Sacramento, grading, concrete paving 1.6 mi. San Bernardino Co., to G. Herz Constr. Co., San Bernardino, $60,846 — widening 7.6 mi. Placer Co., to Frederickson & Watson, 354 Hobart St., Oakland, $66,720. Noted May 16.

Calif., Eureka—For 2 in. warrenite surfacing 3,200 lin.ft., 18 ft. wide, and 7,300 lin.ft. 16 ft. wide road near Arcata, to Mercer-Fraser Co., Eureka, $3.54 and $3.15 per lin. ft. respectively.

Calif., Livermore—Emulsified oiling 200,000 sq.yd., to L. J. Immel, 1031 Evelyn Ave., Berkeley, $0.1435 per sq.yd.

Calif., Long Beach—Grading, concrete paving Orange Ave., to P. P. Janich, Pacific Southwest Bldg., $36,020.

Calif., Long Beach—Grading, curbing, walks, guttering, 4 in. disintegrated granite paving 322,420 sq.ft. Spring St., to P. P. Janich, Pacific Southwest Bank Bldg., $52,549.

Calif., Los Angeles—Grading, curbing sewers, concrete paving Upland Ave., to Raasch & Pursche, $23,974—Dillon St., to T. T. Roach, 2846 Hollenbeck St., $15,794—Andrita St., to G. R. Curtis Paving Co., 2440 East 26, Vernon, $74,523. Grand total, $114,291.

Calif., Los Angeles—Grading, storm drain, asphaltic concrete paving Huntington Dr. South, to Osborn Co., 455 California Terrace, Pasadena, $62,610—Lankershim Blvd. between Burbank and Ventura Blvds., to Gibbons & Reed, 221 East San Fernando Rd., Burbank, $170,295—Ventura Blvd. between Lankershim Blvd. and Pacioma Ave., to W. F. Peck Co., 1120 Las Palmas Ave., $230,830. Grand total $463,735.

Calif., Los Angeles—Los Angeles Co., 186.-635 sq.ft. 8-6-6-8 in. compressed concrete paving 208,152 sq.ft. 5 in. disintegrated rock subbase Amelia St. A & I. 217 to Griffith Co., Railway Bldg., $63,867—grading, curbing, guttering, 9-7-7-9 in. vibrolithic concrete paving 890,200 sq.ft. Normandie Ave., A & I. 70 to Basich Bros., 433 South Spring St., $320,927. Noted May 23.

Calif., Marysville—Supervs. Yuba Co., oiling 6 mi. Brown Valley and Horst Farm Rds., to A. Teichert & Son, 1847 37th St., Sacramento, $8,272 and $7,365 respectively—grading, surfacing 4 mi. Willow Glen Rd., to Jenkins & Treaster, Sacramento, $17,732—grading, scraping 6 mi. Stanfield Rd. to Noble Bros., Stockton, $20,095. Grand total $53,564. Noted May 16.

Calif., Oakland—Alameda Co., grading 10,-000 lin.ft. Hayward-Redwood Rd., to J. F. Collins, Saratoga, $45,500. Noted May 16.

Calif., Oakland—Grading, curbing warrenite surfacing Masonic and Florence Aves., to Western Roads Co., 1305 28th St., $41,455. Noted May 30.

Calif., Roseville — City Council, curbing, guttering, paving 1.5 mi. Atlantic St., to Pacific States Constr. Co., Call Bldg., San Francisco, $47,637. Noted May 2.

Calif., Sacramento — Grading, curbing, guttering, asphaltic concrete paving Robertson Way and Martin Way to McGillivray Constr. Co., Folsom Blvd., $46,001.

Calif., San Diego—Common Council, improving Cliff St. et al., in Solano Beach Vistas, to Watson & Sutton, Box 396, $70,950.

Calif., San Diego—Common Council, grading, curbing, 8 in. asphaltic concrete paving 320,-030 sq.ft. La Jolla Blvd., to Griffith Co., 1308 Newton Ave., $118,154; 6 in. concrete paving 149,639 sq.ft. Vancouver Ave., to Bert Noble, 412 J. D. Spreckles Bldg., $37,002. Noted May 23.

Calif., San Luis Obispo—J. Driscoll, clk. San Luis Obispo Co., grading, asphaltic concrete paving, street lighting system Front St., to I. L. Ryder, 5th and Keys Sts., San Jose, $27,898. Noted May 9.

Calif., Santa Ana—Orange Co., grading, widening, 321,270 sq.ft. graveling base, on 11,700 tons asphaltic concrete paving Lincoln Ave., to Osborn Co., 450 California Terrace, Pasadena, $50,922.

Calif., Whittier—Grading, curbing, walks, concrete paving Pickering Ave., to J. E. Haddock, 357 North Chester Ave., Pasadena, $35,940.

Colo., Colorado Springs—City Council, curbing, guttering, walks in North End Impvt. Dist., to Kimball Constr. Co., P. O. Box 144, $44,260. Noted May 9.

Ga., Vidalia—Concrete paving 6 mi. Vidalia Rd., near here, to Davis Constr. Co., Walter Bldg., Atlanta.

Ill., Chicago—Bd. Local Impvts., City Hall, grading, curbing, guttering, sewers, 8 and 10 in. concrete paving Bixby Court, to Home Paving Co., 134 North La Salle St.—Throop St., to Central Paving Co., 179 West Washington St.—Hortense, Palatine, Clarence, Myrtle and Oriole Aves., to J. A. Ross & Co., 5661 Armitage Ave.—removing old curb, gutter and broken paving, new curbing, guttering, sewers, concrete and asphalt paving West 37th and West 56th Sts., South Keeler, Kedvale, Karlov and Komensky Aves., to R. F. Conway Co., 844 Rush St.—Kimball Ave., to White Paving Co., 1735 Fullerton Ave.—West 95th St., to Calumet Coal Co., 9022 Commercial Ave.—grading, curbing, guttering, sewers, asphalt on 6 and 8 in. concrete paving Emerald Ave., West 105th, 106th, South Halsted and Peoria Sts., to American Asphalt Paving Co., 120 South La Salle St.—Gordon Terrace and Howard Sts., to Barber Paving Co., 7 South Dearborn St.

Ind., Crawfordsville — Comrs. Montgomery Co., concrete paving Charles Morrow Rd., to W. Layne, $35,573. Noted May 30.

Ind., Indianapolis—Marion Co., paving 3 mi. 10th St., from Arlington Ave., to Fort Rd., to Indiana Asphalt Paving Co., 2810 Columbia Ave., $76,427; bridges over Eagle Creek, on 10th Ave., over Buck Creek, Franklin Twp., and 3 bridges, retaining walls on Indian and Buck Creek spans, to E. F. Smith, 2050 South Harding, $79,920. Noted May 30.

Ind., Lafayette—Comrs. Tippecanoe Co., constructing Bone Rd., to O. J. Larkin, Greencastle, $28,767.

Ind., Marion—Comrs. Grant Co., constructing Gillespie Rd., to A. G. Brumfiel & Sons, Marion, $28,500.

Iowa—State Hy. Comn., Ames, to Western Asphalt Paving Corp., 2100 East 4th St., Sioux City, grading, flumes, paving 109,694 sq.yd. Adams Co. $311,703—to W. O'Neill Sons, Fairbault, Minn., 109,694 sq.yd. Clarke Co. $293,-128—to Carlson Constr. Co., Marshalltown, 93,-795 sq.yd. Denison Rd., $210,899; 80,404 sq.yd. Dow City Rd., $176,696, both Crawford Co.—to McCarthy Impvt. Co., Kahl Bldg., Davenport, 85,236 sq.yd. Davis Co. $208,057; 10,626 sq.yd. Scott Co. $29,812; 76,576 sq.yd. Wapello Co. $202,240—to Metz Constr. Co., Springfield, Neb., 152,998 sq.yd. Fremont Co. $363,032—to Beu & Son, Sumner, graveling 10.3 mi. Bremer Co., $11,433—to McDougall Constr. Co., Sioux City, 17.57 mi. Cedar Co. $21,980; 14.02 mi. Cedar Co. $17,539; 7.72 mi. Johnson Co. $9,658—to M. O. Weaver, Iowa Falls, 8.78 mi. Fayette Co. $12,735—25.5 mi. Poweshiek Co. $37,301—to Lansfitt & Co., Cedar Rapids, 2.188 mi. Clayton Co. $7,359; chert and crushed rock surfacing 5 mi. State Park Project, Delaware Co. $4,875. Grand total $1,918,447. Noted July 13.

Ia., Cedar Rapids — Curbing, guttering, asphalt paving 18,600 sq.yd. 3rd Ave. W., 7 in. concrete paving 3,250 sq.yd. car tracks, to Ford Paving Co., Merchants Natl. Bank Bldg., Cedar Rapids, $58,467. Noted June 6.

Ia., Charles City—To Booth & Olson, Sioux City, improving Grand Ave., Kelly, Blunt, Ferguson and Hulin Sts., 30,481 sq.yd. 7 in. rein.-con. paving at $1.77 per sq.yd. 13,599 ft. curbing and guttering $0.45, 8,830 cu.yd. grading $0.40. Noted May 9.

Ia., Villisca—Grading, curbing, guttering, 6 in. rein.-con. paving 24,000 sq.yd., incl. 106,-000 lb. reinforcing, to J. S. McLaughlin & Sons Co., 519 Insurance Exch. Bldg., Des Moines.

Kansas—State Hy. Dpt., Hill City and Eldorado, to A. L. Cook, Ottawa, sand graveling 15.422 mi. road in Butler Co. $28,624, 9 mi. Cowley Co. $5,724—to D. H. Hardman, Alton, 5 mi. Edwards Co., $5,560, 10.16 mi Russell Co. $7,163; 8 mi. Ellis Co. $3,816; 5 mi. Logan Co. $2,376; 37 mi. Grove Co. $17,-094; 18 mi. Trego Co. $9,006—to W. D. Shay, McPherson, 5 mi. Kiowa Co. $4,900—to San-Ore Constr. Co., 6 mi. Reno Co. $2,115—to Yant Constr. Co., 313 Omaha Natl. Bank Bldg., Omaha, Neb., 11.5 mi. Rush Co. $5,141—to Roberts Constr. Co., 209 Putnam Bldg., Wichita, 8.5 mi. Sedgwick Co. $3,471—to M. W. Watson, 30 mi. Thomas Co. $10,690—to G. Bump, Norcatur, grading 6,097 mi. Decatur Co. $9,546—to Young & Hall, Maywood, Neb., 9.246 mi. Graham Co. $2,585. Grand total $117,808. Noted May 23.

Kan., Kansas City—Paving Armstrong St., to G. G. Roudebush, Walker and 6th Sts. $10,-495—44th, 40th and Marty Sts., to C. F. Brindle, 2400 Minnesota Ave. $15,142—34th St., to Brown Bros., 2400 Brown Rd. $6,078—H. Spitcaufsky, 3229 Victor St. $3,080—Parallel St. and 1 alley, to O'Connor Bros., 308 Hall Bldg., $7,205—Springfield St., to J. A. Tobin, 7601 Myrtle St. $5,680—3 alleys, to Drexel Constr. Co., 816 North 8th St., $5,017. Grand total $52,697.

Ky., Louisville—Bd. P. Wks., concrete sidewalks on one or both sides various streets, part of Letting 942, 3 contracts, to Andrews Asphalt Paving Co., 240 East Lee St. $2,807—5 contracts, to J. U. Schickli & Bros., 1837 Greenwood St. $6,121—2 contracts, to F. G. Breslin, 32nd and Market Sts. $4,620—6 contracts, to E. Brewer, $5,049—4 contracts, to K. A. Barker, Floyd & Lee Sts. $7,823—3 contracts, to Henry Bickel Co., 435 Garden St. $6,533—10 contracts, to G. M. Eady Co. Brook, Gilbert and Lee Sts. $9,574—5 contracts, to C. W. McFarland, 1220 River Rd., $5,058—7 contracts, to Woodruff Co., 1050 Barrett St. $5,991. Grand total $53,576. Noted May 16.

Maryland — State Roads Comn., Baltimore, concrete paving 1 mi. Contr. S-31, Somerset Co., to Hannemann-Burroughs Co., Salisbury, $20,992. Noted Apr. 25.

Maryland—State Roads Comn., Baltimore, concrete paving 1.24 mi. Contr. Q-48, Queen Anne Co., to John K. Flick, Sudlersville, $20,-113, 1 mi. Contr. Wi-51, Wicomico Co., to Layfield & Waller Paving Co., Salisbury, $20,857. Noted May 30.

Maryland—Sete Roads Comn., Baltimore, bituminous concrete paving 3 mi. Howard Co., to Baltimore Asphalt Block & Tile Co., 1320 North Monroe St., Baltimore, $34,290—bituminous concrete paving and concrete shoulders on 3.81 mi. Baltimore and Howard Counties, to P. Flanigan & Sons, Harford Rd. and Baltimore & Ohio R.R., Baltimore, $113,385—concrete shoulders on 5 mi. Howard Co., to Thomas, Bennett & Hunter, Westminster, $66,905. Grand total $214,580. Noted June 6.

Maryland — State Roads Comn., Baltimore, graveling 4 mi. Contr. Sm-51, St. Marys Co., to Owens & Nutwell, Harwood, $12,550; concrete paving 1.1 mi. Contr. Co-49, Caroline and Queen Annes Counties, to J. K. Flick, Sudlersville, $18,682. Noted May 30.

Maryland — State Roads Comn., Baltimore, graveling 2 mi. Contr. Ch-66, Charles Co., to DeLuca Contg. Co., Dundalk, $18,490; macadam resurfacing 3.06 mi. Contr. W-62, Washington Co., to P. E. Russell, Frederick, $45,-270. Noted May 16 and 23.

Maryland — State Roads Comn., Baltimore, graveling 2.5 mi. Contr. Sm-52, St. Marys Co., to Southern Maryland Contg. Co., 14 East Lexington St., Baltimore, $23,739. Noted May 9.

Massachusetts—Dpt. P. Wks., State House, Boston, bituminous macadam paving 29,693 ft. hy. in Charlton and Sturbridge, to Lane Constr. Corp., 134 State St., Meriden, Conn., $101,488. Noted May 30.

Massachusetts—Dpt. P. Wks., State House, Boston, bituminous macadam paving 7,446 ft. hy. in Hudson, to J. Iaffolla, 15 Noyes Pl., Boston, $39,698—3,970 ft. Gloucester, to Welch & Moynihan, 15 Front St., Salem, $32,890—850 ft. Amesbury, to J. J. Watkins, Glenwood St., Amesbury, $3,385—gravel and bituminous macadam paving 2,550 ft. hy. in Newbury, to Lincoln & Belding, Marlboro, $11,649—waterbound macadam and bitulithic surfacing 3,450 ft. Rehoboth, to Z. L. Canedy, Lake, $16,525. Grand total $104,147. Noted June 6.

Mass., Medford (br. Boston)—Street Dpt., sheet asphalt and bituminous paving 40 streets, separate contracts, $230,000.

Michigan—At office H. I. Davis, div. engr., Escanaba, concrete paving 3.292 mi. F055-9, C-2, 20 ft., Menominee Co., to M. J. Bacco, Iron Mountain, for State Hy. Dpt., Lansing, $91,924, incl. cement. Noted May 23.

Michigan — E. R. Benkert, resident engr., Port Huron, concrete paving 6.212 mi. M079-23, C-1, 20 ft., Tuscola Co., to T. McNally, Saginaw, for State Hy. Dpt., Lansing, $146,796. Noted May 23.

Michigan—R. W. Roberts, resident engr., Saginaw, concrete paving 3.159 mi. M073-22, C-4, 40 ft. Saginaw Co., to Hersey Gravel Co., Hersey, for State Hy. Dpt., Lansing, $110,965. Noted May 16.

Michigan — G. D. Tramp, resident engr., Crystal Falls, concrete paving 3.677 mi. M027-15, C-1, 20 ft., Gogebic Co., to J. J. Bacco, Marquette, for State Hy. Dpt., Lansing, $126,-279. Noted May 16.

Mich., St. Clair—For 8 in. slab concrete paving 10,000 sq.yd. Trumble St., to J. H. Baker & Son, Port Huron, $30,000.

Constr. News page 381

Streets and Roads (Continued)

Minn., East Grand Forks—A. G. Rand, city clk., warrenite bitulithic resurfacing 7,000 sq.yd. Demers Ave. and adjacent sections, to Haggart Constr. Co., 214 Robert St., St. Paul, $25,490. Noted May 23.

Minn., Owatonna—Curbing, concrete paving 12,567 sq.yd. Project 5, to Central Constr. Co., Crosby, $32,019. Est. $30,000. Noted May 23.

Minn., St. Paul—Paving Stonebridge Blvd. between Jefferson Ave. and St. Clair St., to Thornton Bros., 1343 Dayton Ave., $39,887. Est. $60,000. Noted Apr. 4.

Miss., Canton — Concrete curbing, guttering, sidewalks, grading, Kentucky rock asphalt on Camden gravel paving, to Lawrence Constr. Co., Jackson. Est. $32,000.

Miss., Jackson—Grading, curbing, guttering 7 mi. Cherokee Heights, Hawthorne Hill, Chickasaw Park, Johnson Heights and Beverly Circle, to J. W. Robertson & Co., Gulfport, $35,000.

Miss., Kosciusko — Attala Co., warrenite on concrete surfacing 9,554 sq.yd. Federal Aid Project 54-A, to Barber Bros. Constr. Co., Baton Rouge, La., $27,600. Noted May 23.

Miss., Laurel—Jones Co., improving Laurel-Ovett Rd., road work and bridges, to Berry Bros., Laurel, $37,721, grading and grubbing, to J. H. Cook, Laurel, $10,848. Noted May 23.

Miss., McComb—Grading, 6 in. concrete paving Burke St., to Merrill Eng. Co., Lamar Life Bldg., Jackson, $25,500.

Miss., Meridian—Paving 35,264 sq.yd., to Dunn Constr. Co., Lincoln Life Bldg., Birmingham, Ala., $72,000; 35,004 sq.yd., to Wright Constr. Co., 3001 5th St., $65,000.

Mo., Excelsior Springs—Grading, 7 in. rein.-con. paving 5 blocks Bway., to E. J. Tiernan Co., Macon, $17,088. Noted May 9.

Mo., St. Joseph—Asphaltic concrete repaving 4th St. between Jules and Faraon Sts., to Land Constr. Co., Corby Bldg., $2,325; 4th St. between Faraon and Isabelle Sts., to Judson Eng. & Constr. Co., 1811 Faraon St., $30,782.

Nebraska—State Hy. Comn., Lincoln, to J. L. Reel, Dalton, grading 4.8 mi. Deuel Co. $13,535; 8 mi. Morrill Co. $25,748—to Young & Hall, Maywood, 18.4 mi. Lincoln Co. $75,439—to G. W. Condon, Omaha, grading 6.3 mi. Kearney Co. $14,643; culverts in Otoe Co. $7,457—to Reel & Kennedy, Dalton, grading 11.4 im. Cheyenne Co. $17,085—to F. L. Busche, Omaha, grading 5.3 mi. Sarpy Co. $12,493, corrugated culverts on same road $5,830; graveling 15 mi. Saline and Lancaster Counties $7,355; 4.4 mi. Lancaster Co. $2,789; 2 mi. Saline Co. $1,368; 9 mi. Sarpy Co. $5,323; 11.5 mi. Washington Co. $6,802; 14 mi. Burt Co. $11,085—to Allied Contrs., Inc., Omaha, grading 9.5 mi. Custer Co. $28,072; corrugated culverts on same road $3,089; 3 bridges $5,761; graveling 9.5 mi. York Co. $12,050—to Yant Constr. Co., Omaha, graveling 5 mi. Howard Co. $17,504—to Central Bridge & Constr. Co., 12.3 mi. Lincoln Co. $26,589; 9.3 mi. Sherman and Howard Counties $13,008—to A. Einung, Nebraska City, 10.3 mi. Antelope Co. $36,079—to W. Krotter, Stuart, 1.5 mi. Cherry Co. $2,320; 2 mi. Holt Co. $1,923—to Carstensen Sand Co., Columbus, 20.5 mi. Madison Co. $74,996—to Koehler Constr. Co., Sterling, 14 mi. Pawnee Co. $50,392; 2.8 mi. Cherry Co. $8,092—to Western Bridge & Constr. Co., Omaha, grading 7.1 mi. Antelope Co. $34,131; graveling 10 mi. Boyd Co. $7,010; 11.1 mi. Knox Co. $7,930; 18.4 mi. Colfax Co. $39,701; 6 mi. Holt Co. $4,101; 10.3 mi. Cherry Co. $29,276; 8.7 mi. Antelope and Knox Counties $9,797; 6 bridges in Cheyenne Co. $24,747—to L. G. Crownover, Lincoln, grading 7.4 mi. Sherman Co. $20,313—to Dobson & Robinson, Lincoln, paving 8.8 mi. Lancaster Co. $173,400; 2.7 mi. Dakota Co. $60,301; 5 mi. Platte Co. $130,728; 2 mi. Sarpy Co. $45,015; 5.2 mi. Scottsbluff Co. $131,574. Grand total $1,222,149. Noted May 9.

Neb., Lincoln—T. H. Berg, city clk., asphaltic concrete paving 380 sq.yd. Dist. 753, and 3,160 sq.yd. Dist. 789, to Cochrane Constr. Co., 822 1st Natl. Bank Bldg., $1,369 and $14,246 respectively—9,230 sq.yd. Dist. 794, to Abel Constr. Co., 308 Terminal Bldg., $29,145—grading Dist. 44, to J. W. McGerr, 2535 Washington St. $2,000. Grand total $46,760. Noted Mar. 21.

Neb., Omaha—To F. L. Busche, Omaha, paving 16,097 sq.yd. 17th, State, 22nd and Erskine Sts., asphalt at $2.70 per sq.yd., asphaltic concrete $2.40, vitr. brick $3.40, art stone $2.40.

New Hampshire—State Hy. Dpt., Concord, 6 in. one course rein.-con. on 3 in. gravel paving 16,701 sq.yd. Daniel Webster Hy. in Pembroke, to Carlo Bianchi & Co., Framingham, Mass., $49,293, est. $60,000; 3 in. bituminous macadam on 8 in. cinder paving 8,700 sq.yd. same road in Lincoln, to O. W. Fernald, Berlin, $34,135, est. $35,000. Noted May 30.

New Hampshire—State Hy. Dpt., Concord, 6 in. one course rein.-con. on 4 in. gravel paving 58,891 sq.yd. South Side Rd., Stratham, to Carlo Bianchi & Co., Ashland, Mass., $173,129. Est. $220,000. Noted June 6.

New Jersey—State Hy. Comn., Trenton, 8 in. rein.-con. paving 83,850 cu.yd. road, Gloucester and Salem Counties, to G. Gentish, Bridgeton, $246,788.

N. J., East Orange—City Council, City Hall, 2 in. National, 2 in. warrenite bitulithic pav-

Constr. News page 382

ing North 16th St. and St. Agnes Lane, to Standard Bitulithic Co., foot Brill St., Newark, $42,837.

N. J., Hopatcong—Bd. Freeholders Sussex Co., Court House, grading, concrete and earth paving Maxim Dr. Sect. 2, to J. F. McGreevey, Manasquan, $37,485. Noted May 16.

N. J., Jersey City—Bd. City Comrs., City Hall, grading, paving Ocean Ave., to New Jersey Asphalt & Paving Co., Inc., foot Jersey Ave., 82% est. $25,000.

N. J., Millburn—Bd. Freeholders Essex Co., Court House, sheet asphalt on 6 in. concrete paving Springfield Ave., to Loprete Asphalt Co., 423 Amherst St., East Orange, $126,746.

N. J., Newark—Bd. Freeholders Essex Co., Court House, sheet asphalt on concrete paving Eagle Rock Ave., to Jannarone Contg. Co., 225 Passaic Ave., Belleville, $68,532. Noted June 20.

N. J., Newark—City Comrs., City Hall, grading, curbing, sheet asphalt on 6 in. concrete paving Custer Ave. and Custer Pl., to H. F. Gilligan's Son, 133 1st St., Newark, $18,871. Noted May 23.

N. J., Newton—Bd. Freeholders Sussex Co., Court House, June 4, concrete on earth paving Franklin Boro viaduct approach, to Culp Constr. Co., East McFarlan St., Dover, $19,059. Noted May 23.

N. J., Union—Twp. Comn., Town Hall, 7 in. rein.-con. paving Axton Ave. and 6 in. rein.-con. paving Newark Ave., to Elizabeth Paving Co., 715 Elizabeth Ave., $74,899 and $30,959 respectively. Noted May 2.

N. J., West New York — Bd. Boro Council, Municipal Bldg., bituminous concrete paving 13th St., to Clinton Asphalt Co., 308 16th St., 105% est. $33,000.

New York—A. W. Brandt, comr. Hys., Albany, **(e.e. means engineers estimate)**, concrete paving 4.94 mi. Dutchess Co., to Lane Constr. Co., 37 Colony St., Meriden, Conn., $205,874 e.e. $302,765—0.66 mi. Chautauqua Co., to Wing & Dymond, Holley, $26,942 e.e. $34,812—6.38 mi. Jefferson Co., to F. J. Downing, 134 Swann St., Buffalo, $397,933 e.e. $551,961—7.72 mi. Niagara Co., to W. J. Knauer, Attica, $405,392 e.e. $551,250—8.41 mi. Cattaraugus Co., to J. A. Gudgell, Inc., Belfast, $126,376 e.e. $170,802—1.2 mi. Steuben Co., to W. L. Collins, Hornell, $43,427 e.e. $58,488—3.01 mi. Suffolk Co., to Northport Sand & Gravel Co., Washington St., Northport, $87,299 e.e. $124,480—6.49 mi. Steuben Co., and concrete and bituminous macadam paving 5.76 mi. Cattaraugus Co., to Cold Spring Constr. Co., Akron, $318,180 and $301,568 respectively, e.e. $470,747 and $377,733 respectively—4.45 mi. Chautauqua Co., to J. and M. Doyle Co., Erie, Pa., $174,337 e.e. $240,113—0.18 mi. Queens Co., to United Road Constr. Co., Astoria, $20,055 e.e. $58,488—grading storehouse site, Westchester Co., to A. Riegel & Sons, Inc., 2 Hamilton Ave., White Plains, $2,655 e.e. $4,050. Grand total $2,110,038. Noted May 30.

N. Y., St. George—J. A. Lynch, pres. Richmond Boro, Boro Hall, to Vanbro Constr. Co., 24 Elizabeth St., West New Brighton, bituminous concrete paving Amboy Rd. $14,373; Metcalfe St. $3,666; culvert in Bard Ave. $3,665. Grand total $21,704. Noted June 6.

O., Akron—Summit Co., grading, traffic bound slag paving 2.2 mi. Chamberlain Rd. C.H. 128, Sect. A, to Costigan Shroyer Constr. Co., 106 North Main St., $21,045, est. $25,000; 2 mi. Hudson-Aurore Rd. C.H. 39, Sect. B, to Troyer Constr. Co., Aurora, $18,435, est. $23,500. Noted June 6.

O., Barberton — Improving Morgan, Sumit, Keller, Bert, Hiram Sts., to Columbus Asphalt Co., 234 South Cassaday Ave., Columbus, $48,732.

O., Cleveland—Comrs. Cuyahoga Co., maintenance of macadam roads, to Bituminous Constr. Co., Natl. City Bldg., $402,218, to W. E. McHugh, West 73rd St. and Wheeling & Lake Erie R.R., $127,728, and to J. C. Fisher, Lorain Rd., $24,456. Grand total $554,402.

O., Cleveland — Concrete sidewalks in Northerly and Southerly Dists., to Peerless Constr. Co., c/o M. Velotta, East 143rd St., $37,479; Western and West Park Dists. to Cleveland Concrete Co., c/o city, $36,477. Noted May 30.

O., Columbus—W. H. Duffy, dir. Service, 3 in. brick paving 3,570 sq.yd. Gates St. and 3,190 sq.yd. Walsh Ave., to R. J. Dienst, 209 South High St., $18,894 and $15,299 respectively—asphalt paving 1,880 sq.yd. Gault St., to Fitz-Pyle Constr. Co., 209 South High St., $8,856—18,320 sq.yd. Mound St., to Franklin Asphalt Paving Co., 209 South High St., $83,745—3,490 sq.yd. Summit St., to B. F. Patterson, 999 West Goodale St., $26,731—2,280 sq.yd. Wheatland Ave., to Cleveland Trinidad Paving Co., Grand Theater Bldg., $10,648. Grand total $164,173.

O., Youngstown—Macadam paving 1.7 mi. Struthers-Poland Rd., 18 ft., to E. E. Miller & Son, Town Line Rd., $48,649. Est. $50,000.

Okla., Ada—Grading, 6 in. concrete paving 9,600 sq.yd. 12th St., to Chilcutt & Fry Bros., Ada, $30,800. Est. $32,000. Noted Apr. 11.

Okla., Altus—Jackson Co., grading, disintegrated granite graveling 15.5 mi. Duke-Eldorado Hy., Projects 12, 13 and 14, to Western Constr. Co., 922 1st Natl. Bank Bldg., Oklahoma City, $66,602.

Okla., Duncan—Grading, paving 9 blocks Beach, 14th and Cherry Sts., to Frederick Constr. Co., Frederick, $32,653. Est. $35,000.

Okla., Heavener—For 6 in. concrete paving 13,800 sq.yd. Dists. 1 and 1-A, to Highway Constr. Co., Daniels Bldg., Tulsa, $[illegible]. Noted May 30.

Okla., Heavener—Grading, 6 in. concrete paving 13,640 sq.yd. C. B. 1st and Main Sts. to Highway Constr. Co., Daniels Bldg., Tulsa, $36,412. Est. $38,663. Noted May 16.

Okla., Lawton—Widening, concrete paving 7,940 sq.yd. Ft. Sill Blvd., to Connelly Bros., El Reno, $19,076. Est. $27,420. Noted May 30.

Okla., Maysville—Grading, concrete paving 9,470 sq.yd. 6th, Main and Williams Sts., to Connelly Bros., El Reno, $30,553. Est. $31,701. Noted May 23.

Okla., Oklahoma City—Oklahoma City, gravel top surfacing 6 mi. May Avenue Rd., 18 ft., and 6 mi. West Edmond Rd., 18 ft., to Maney & Alley, Empire Bldg., Oklahoma City, $[illegible] and $16,250 respectively. Est. $25,000 each.

Pa., Phila.—Dpt. P. Wks., Bureau of Hys. A. Murdock, dir., grading Tabor St., to Marino Masse, 3936 North Reese St. $3,254—asphalt paving (assessment work), Charles and Tackawanna Sts., also James St., to Mack Paving & Constr. Co., Nicetown and Luzerne Sts., $12,731 and $5,978 respectively—Unruh St., to Montgomery Paving Co., Harrison Bldg., $9,258—improving Cheltenham and smooth dressed granite block repaving Juniper St., to Keystone Contg. Co., 1607 McKean St., $32,166 and $2,912 respectively—asphalt repaving Huntingdon and 23rd Sts., also redressed granite block repaving Sedley St., to Municipal Constr. Co., Washington Bldg., $12,682 and $28,643 respectively—asphalt repaving Wayne St., incl. track area, to Barber Asphalt Co., Hunting Park Ave. and E St., $73,128—York St., and resurfacing 17th St. (track area), to Eastern Asphalt Co., Penn Bldg., $31,449 and $6,998 respectively—redressed granite block repaving Lawnton St. and track area of 17th St., to United Paving Co., Widener Bldg., $5,533 and $7,896 respectively—fast hardening portland cement, to E. F. Bennis & Sons, 825 East Washington Lane, $3,390; batch mixed pebbles, concrete sand, to Werner Co., 1518 Walnut St., $2,559. Grand total $239,216. Noted June 6.

Pa., Phila.—Dpt. P. Wks., Bureau of Engineering & Surveys, Upper Frankford Creek Low Level Collecting Sewer, to Mazzola & Marano, Inc., 739 South 7th St., $250,999. Noted May 16.

Pa., Pittsburgh—Grading, curbing, paving Stadium St., to DePasquale & Co., 373 Boquet St., $34,845, est. $40,000—Island Ave. between Brighton Rd. and Hyena St., to John Carson & Son, Fulton Bldg., est. $30,000—Smithton St., to Donatelli & Donatelli, 7202 Spencer St., $28,486, est. $30,000—grading 10,880 cu.yd., brick on concrete paving 5,000 sq.yd. Berry St., to Minsinger Co., 1201 Vickroy St., $42,242 est. $45,000—grading 9,130 cu.yd., brick paving 3,470 sq.yd. Herschel St., to Booth & Flinn, Forbes Bldg., $51,142. Est. $60,000.

Pa., Pittsburgh—Comrs. Allegheny Co., Court House, Charles Street Approach to East Street Bridge between Charles and Essem Sts., to Booth & Flinn, Forbes Bldg., $66,421. Noted May 23.

Tennessee—State Dpt. Hys. & P. Wks., Nashville, grading 3.712 mi. Hancock Co., to M. T. McArthur, Johnson City, $95,256—5.309 mi. Jackson Co., to Marion Constr. Co., Adams, $48,863—11.271 mi. Henry Co., to Gregory Chandler Co., Dickson, $97,410—7.415 mi. Knox Co., incl. 2 bridges, to Chandler Bros., Virgilina, Va., $104,432—concrete paving with shoulders 12.394 mi. Haywood Co., and 6.808 mi. Knox and Sevier Counties, to Municipal Paving & Constr. Co., Nashville, $245,016 and $134,422 respectively. Grand total $725,399. Noted May 23.

Tennessee—State Dpt. Hys. & P. Wks., Nashville, improving 4.48 mi. road in Davidson Co., to Chandler Bros., Bellevue, $71,443. Noted May 9.

Tex., Higgins — For 6 in. concrete paving 13,284 yd., to L. S. Fisher Constr. Co., Woodward, Okla., $40,013.

Tex., Whitewright—F. M. Echols, mayor, concrete paving 12,960 sq.yd., to Coombs & Glade, Wichita Falls, $36,310. Noted June 6.

Virginia—Dpt. Hys. Richmond, sheet asphalt paving 3 mi. Pittsylvania Co., to McGuire & Rolfe, 1009 Brooke Rd., Richmond, $59,111—rock asphalt paving 2.8 mi. Pittsylvania Co., to Haynes Constr. Co., Chatham, $79,876—5.356 mi. Montgomery Co., to Powell Paving Co., Winston-Salem, N. C., $118,881—bridge, Westmoreland Co., to J. M. Cowherd, Gordonsville, $16,486. Grand total $274,354. Rejected bids June 4, sheet asphalt paving 1.3 mi. Arlington Co.; constructing bridge over Cedar Creek, Shenandoah Co. Noted May 30.

Wash., Longview—Bethlehem Steel Co., 1 mi. Longview Bridge Approaches, 27 ft., to H. Niblett, Longview, $80,000.

Wash., Seattle—Bd. P. Wks., 7 in. concrete paving 51st Ave. S., to Fiorito Bros., 3950 6th St. N.W., $38,441.

Wash., Waterville—Douglas Co., constructing 5 mi. Withrow Rd., to M. E. Nelson, Tonasket, $22,557. Est. $24,500.

W. Va., Charleston—Kanawha Co. Court, R. N. Moulton, clk., grading 3,000 ft. Loudon-Heights-Coal Hollow Rd., Project 159, to W. J. Weakland & Co., Grosscup Dr., $5,540—1 mi. Martins Branch Rd. extension, Project 136, to Markle, Coleman, Smith & Young, Clay, $9,361—rejected bids June 11 concrete or stone and concrete substructure Rich Fork Bridge, Project 134. Noted June 6.

Streets and Roads (Continued)

W. Va., Parkersburg—M. L. Hoffman, city clk., widening, rein.-con. paving Liberty St. et al., to D. A. Criss, Parkersburg. $27,298. Noted June 6.

Wisconsin—State and Polk Co. Hy. Comrs., Div. Office 8, Superior, graveling 56,000 cu.yd. Project 408-D, to V. Nelson, Superior, $31,446. Noted May 30.

Wis., West Allis—Vibrolithic concrete paving 25,538 sq.yd., to Mineral Aggregate Cooperative Assn., 192 4th St., Milwaukee at $1.75 per sq.yd. Noted May 2.

Wyoming—State Hy. Comn., Cheyenne, grading 154,600 cu.yd. F.A.P. 192-B, to H. C. Lollier, Denver, Colo., $57,229—180,700 cu.yd. F.A.P. 182-B, to M. G. McCarhan & Son, Scotts Bluffs, Neb., $38,830—155,150 cu.yd. F.A.P. 120-B, and crushed rock surfacing 65,000 cu. yd. F.A.P. 189-B, to Watts Bros. Constr. Co., Buffalo, $37,243 and $64,950 respectively — 18,600 cu.yd. F.A.P. 184-B, to C. A. Robinson, Montpelier, Idaho, $27,900—graveling 28,100 cu.yd. State Hy. 767, to Stevens Bros., 612 Endicott Bldg., St. Paul, Minn., $33,235. Grand total $59,387. Noted June 6.

Ont., Brockville—Town Council, bituminous on concrete paving Pearl and James Sts., to Ontario Amiesite Ltd., Commerce and Transportation Bldg., Toronto, $74,755. Noted May 2.

Ont., Huntsville—T. M. Cullon, town clk., concrete curbing, guttering, bituminous on concrete paving 1¼ mi. Main St., to Brennan Paving Co. Ltd., 400 Gage Ave. N., Hamilton, $54,950. Est. $60,000. Noted May 30.

Ont., St. Catherines—A. H. Trapnell, secy. Suburban Road Comn., concrete paving Pelham Rd., to Premier Constr. Co., 924 Windsor St., Windsor, $80,000. Noted May 30.

Ont., Toronto—Paving Bloor St. W. from Yonge St. to Avenue Rd., to Constructing & Paving Co., Confederation Life Bldg., $38,112; Bloor St. W. from Avenue Rd. to St. George St., to Godson Contg. Co., 203 Richmond St. W., $30,227.

Ont., Toronto—York Twp., asphalt and bitulithic paving Henrietta and Royal Aves., to Constr. & Paving Co., Confederation Life Bldg., $26,305—Jane St. and Kane Ave., to Warren Bituminous Paving Co., 54 University Ave., $25,059—Livingstone Ave., to Kelmer & Barber, Harbor Comrs. Bldg., $17,049—concrete sidewalks on Winnett Ave., to S. Simpson, 288 Wychwood Ave., $1,111—Vaughan Rd. and 3 avenues, to owners, by day labor, $4,817. Grand total $74,341.

Ont., Wallaceburg—Town, concrete and asphaltic paving 15,500 sq.yd., 4,200 lin.ft. concrete sidewalks, to Merlo, Merlo & Ray, Sandwich St., Ford. Est. $45,000.

Ont., Waterloo—Town Council, concrete curbing, guttering, sheet asphalt on concrete paving 10,700 sq.yd., to Standard Paving Co., Ltd., Harbor Bldg., Ottawa. Est. $35,000. Noted May 9.

Public Bond Elections

Coming Bond Elections

Sewers and Sewage Disposal—Muskegon Heights, Mich., July 24, $185,000.

Waste Disposal — San Francisco, Calif., $1,000,000.

Roads—Madison County, Ia., $1,400,000.

Roads—Van Zandt County, Tex., July 27, $1,500,000.

Schools—Mobile, Ala., July 9, $500,000.

Fire Alarm System — Sacramento, Calif., $100,000.

School and Library—Bristol, Tenn., June 29.

Bonds Voted

Roads—Christian County, Ky., $650,000.

Roads—Haskell County, Tex., $25,000.

Hospital—Palo Alto, Calif., $250,000.

School—Boling, Tex., Independent School Dist., $160,000.

Lighting System—Bremerton, Wash., $750,000.

Bonds Defeated

Waterworks—Billings, Mo., $40,000.

Waterworks and Sewers — Norborne, Mo., $75,000.

Paving—Oswego, N. Y., $400,000.

Buildings—Industrial

Proposed Work

Ala., Montevallo—MILL—Montevallo Cotton Mills, W. F. Strowd, pres., mill, Dorster Pl.

Calif., Glendale — AIRPLANE FACTORY — Vortex Wing Corp., Glendale, plans by C. J. Weyl, 6536 Sunset Blvd., Los Angeles, 1 story, 60 x 82 ft., brick.

Calif., Grimes—WAREHOUSE—Grimes Farm Center, rebuilding 1 story, 50 x 450 ft. grain warehouse, elevator, recently destroyed by fire. $85,000.

Calif., Huntington Park — FACTORY — Axelson Machine Co., 6160 South Boyle Ave., 1 story, 120 x 220 ft., steel addition, Randolph and State Sts. Private plans.

Calif., Los Angeles—CANDY FACTORY—Bonnie Jean Candy Shops, 125 West 5th St., plans by B. Dale, 7220 Beverly Blvd., 2 story, 40 x 135 ft., brick, Beverly Blvd.

Calif., Modesto — BAKERY — San Joaquin Baking Co., C. M. Bowersmith, mgr., concrete, 10th Ave. and Needham St. $125,000.

Conn., Greenwich—AUTO SALES and SERVICE STATION—McKeever Chevrolet Co., Greenwich, plans by Fletcher-Thompson, Inc., 542 Fairfield Ave., Bridgeport, 1 story, 80 x 200 ft., brick, concrete steel, Post Rd. $75,000.

Ga., Atlanta—GARAGE—H. Richardson, 160 Peachtree Rd., plans by A. Ten Eyck Brown, 717 Forsythe Bldg., 3 story, basement, 100 x 120 ft., brick, rein.-con., steel, plain found., Spring and Baker Sts.

Idaho, Downey—MILK PLANT—S. L. Bingham utility milk plant. $200,000.

Ind., Indianapolis—FACTORY—U. S. Corrugated Box Co., 1315 Martindale Ave., plans by C. E. Bacon, Odd Fellows Bldg., brick, rein.-con., 103,000 sq.ft. floor space, Martindale and Roosevelt Aves. $200,000.

Ind., Indianapolis—PETROLEUM REFINING PLANT—Standard Oil Co., 137 West 11th St., rein.-con., brick, 23rd St., Ralston & Hillside Aves. $100,000. Private plans.

Ind., Lafayette—SERVICE GARAGE—H. H. Horner, 625 Columbia St., plans by F. P. Riedel, 825 Lafayette St., 130 x 165 ft., brick, rein.-con., stone, East Main St. $50,000.

Kan., Manhattan — GARAGE — Manhattan Motors Co., c/o A. H. Brewer, archt., will award by private contract 2 story, basement, 100 x 150 ft., rein.-con., brick, stone. $50,000. Former bids rejected.

Mass., Charlestown (sta. Boston) — POWER PLANT — Edison Electric Illuminating Co., 39 Boylston St., Boston, 1 story, 40,000 sq.ft. floor space, Alford St. Private plans.

Mass., Malden (br. Boston)—SERVICE and REPAIR GARAGE and SHOWROOM — R. C. Clark, 73 Center St., plans by C. F. Springall, 50 Park St., 1 story, 60 x 190 ft., brick, stone, steel, plain found., 105-107 Center St. $50,000.

Mass., Waltham—MANUFACTURING—J. W. Greer Co., 119 Windsor St., 2 story, 80 x 500 ft., brick, concrete, plain found., Grove St. Engineer and architect not selected.

Mich., Battle Creek — FACTORY — W. K. Kellog Co., 246 Champion St., 5 story, part basement, 100 x 350 ft., rein.-con., brick, plain found., Stoles St. $750,000.

Minn., St. Paul—FACTORY—Minnesota Mining & Mfg. Co., E. B. Ober, pres., Forest and Fauquier Sts., plans by Toltz, King & Day, 1212 Builders Exch., 2 story, basement, rein.-con., brick addition. $150,000.

Minn., St. Paul—PRINTING PLANT—Webb Publishing Co., 55 East 10th St., plans by Mather & Fleischbein, 422 Endicott Bldg., 3 or 4 story, basement, rein.-con., brick addition. $200,000.

Mo., Kansas City—BAKERY and COFFEE ROASTING PLANT—Bird Stores, Inc., 2101 Bway., plans by Archer & Gloyd, Finance Bldg., bakery and coffee roasting plant, 206 and Wyandotte Sts. $200,000. H. Von Unwerth, Finance Bldg., engr.

Nev., Reno—FREIGHT STATION—Southern Pacific R.R. Co., G. W. Boeschke, ch. engr., 65 Market St., San Francisco, Calif., concrete, brick freight station, platform. $75,000.

N. J., Linden—FACTORY—Elizabeth Avenue Holding Co., c/o A. J. Silberstein, archt., 60 Park Pl., Newark, 3 story, basement, brick, steel, plain found., Elizabeth Ave. $40,000.

N. J., Paterson—MACHINE SHOP—Watson Flagg Eng. Co., 214 Straight St., 1 story, basement, 75 x 125 ft., brick, steel, plain found., 843-7 East 25th St. $40,000. Private plans.

N. Y., Brooklyn — SERVICE GARAGE — Orange Fulton Realty Corp., J. Ellman, pres., 153 Pierrepont St., bids latter part of month, general contract 9 story, Orange and Fulton Sts. To exceed $500,000.

N. Y., Brooklyn—TERMINAL WAREHOUSE —Water Front Service Corp., 26 Court St., plans by Moores & Dunford, 110 East 42nd St., New York, 8 story, rail and water terminal warehouse. $3,000,000.

N. Y., Harmon—LOCOMOTIVE and CAR SHOPS—New York Central R.R. Co., F. B. Freeman, ch. engr., 466 Lexington Ave., New York, altering locomotive and car shops. $100,000.

N. Y., Long Island City—FACTORY—Stahl Nuyer Co., c/o Allmindinger & Schlendorf, 852 Monroe St., Brooklyn, 2 story, 118 x 160 ft., brick, Cody St. and Wyckoff Ave., $50,000.

N. Y., New York—FACTORY—Art Steel Co., 401 East 23rd St., factory, College Ave. and 145th St. $250,000. Engineer and architect not selected.

N. Y., New York—MILK DEPOT—B. Munday, 322 West 22nd St., plans by W. M. Farrar, 250 8th Ave., 2 story, 91 x 92 ft., brick, 435 West 18th St. $45,000.

N. Y., New York—SERVICE GARAGE—Har Webb Realty Co., H. Weprin, pres., 145 West 27th St., plans by M. J. Ort, 424 East 149th St., altering and constructing 6 story, 75 x 100 ft., brick, concrete, 2-8 Sylvan Pl. $100,000.

N. Y., New York—SERVICE GARAGE—Venitian Contg. Co., J. Philip, pres., 2 Lafayette St., plans by F. Wolfgang, 631 East Tremont Ave., 2 story, brick, Barretts St. and Ryaiva Ave. $40,000.

N. Y., New York — STEAM GENERATING PLANT — New York Steam Corp., D. C. Johnson, pres., 280 Madison Ave., altering and constructing 3 story, 107 x 178 ft., brick addition, 172 Water St. and 222 Pearl St. $250,000. Private plans.

N. C., Burlington—PLANT—C. P. Phillips, et al., mercerizing plant, 60,000 lb. weekly capacity. $100,000.

O., Cleveland—FACTORY—Lakeland Aviation Co., Inc., J. E. Mathews, pres., 1070 Union Trust Bldg., brick, steel, East 38th St. and Lakeside Ave. Private plans.

O., Toledo—PLANT—Union Carbide & Carbon Co., 30 East 42nd St., New York, plant, $150,000. Private plans.

O., Youngstown — FACTORY — McKay Machine Co. soon takes bids rebuilding, enlarging present plant, Rayen Ave. and Foster St. $100,000. Private plans.

Pa., Phila.—MACHINERY—Simon & Simon, archts., Fidelity-Phila. Bldg., soon lets contract 3 story, 66 x 78 ft., 1 story, 56 x 78 ft. and 61 x 82 ft., all basement, brick, steel, plain found., 6th St. and Tabor Rd., for Proctor & Schwartz, 6th St. and Tabor Rd.

Pa., Phila.—PACKING PLANT—A. E. Bump, engrs., c/o Swift & Co., 60 North Market St., Boston, Mass., soon lets contract 3 story, basement, 94 x 151 ft., rein.-con., brick addition, plain found., 9th and Girard Sts., for Swift & Co., $300,000.

Tex., La Feria—PACKING PLANT—Texas Citrus Fruit Growers Exch., c/o J. Shary, Mission, plans by H. P. Smith, c/o National Bank of Commerce Bldg., 1 story, basement, 96 x 125 ft., brick, rein.-con. plant. $45,000. H. H. Ewing, Mission, engr.

Tex., Mission—BAKERY—W. Alejos, 1 story, 40 x 70 ft., brick, concrete. Owner probably will build. Private plans.

B. C., New Westminster — MILL — Brunette Lumber Co. planing mill. $125,000.

Man., St. Boniface—PLANT—Berkdale Dairy Co., plant. $75,000.

Man., St. Boniface — PLANT — Golden Standard Paint Co. Ltd., plant. $150,000.

Ontario—FACTORIES—Ditchburn Boats Ltd., Orillia, H. Ditchburn, mgr., additions at Orillia and Gravenhurst. $200,000.

Ont., Galt—FACTORY—Narrow Fabrics Ltd. plans by J. Evans, Water St., new textile factory, Spruce St. $75,000.

Ont., Kitchener—FACTORY—Elshy Furniture Co., factory, Wilmot St. $100,000.

Ont., Kitchener—FACTORY—Kaufman Rubber Co. Ltd., factory addition, North Francis St. $125,000.

Ont., Newmarket — FACTORY — Office Specialty Mfg. Co., H. C. Slemin, mgr., 3 story, basement, 55 x 200 ft., concrete, brick addition, Timothy St. $100,000. Private plans.

Ont., Stratford—FACTORY—Kroehler Mfg. Co., F. W. Trebell, mgr., 3 story, basement, 65 x 100 ft., and 45 x 100 ft. addition, Ontario St. $100,000. Private plans.

Ont., Walkerville—FACTORY—Chrysler Motor Car Co., J. D. Mansfield, pres., plans by Hutton & Souther, 6 James St., South Mailton, 5 story, 100 x 200 ft. addition. $500,000.

Ont., Walkerville — FACTORY — Motor Products Corp., E. H. Carr, mgr., plans by Smith, Hinchman & Grylls, Marquette Bldg., Detroit, Mich., steel addition. $50,000.

Que., Actonvale—FACTORY—Eastern Rubber Co. Ltd., factory addition. $50,000.

Que., Hull—PLANT—Keyes Fiber Co., Inc., W. E. Parsons, mgr., Waterville, Me., and 420 Lexington Ave., New York, plant. $300,000.

Que., Lachine — PLANT — Dominion Wire Rope Ltd., F. H. Hopkins, vice-pres., 250 ft. plant extension. $150,000.

Bids Asked

Calif., Patton—KITCHEN and BAKERY—July 9, by G. B. McDougall, state archt., P. Wks. Bldg., Sacramento, 1 story, basement, 75 x 180 ft., steel, rein.-con., at State Hospital. $130,000. Noted May 9.

Conn., Danbury—GARAGE, SHOWROOM and OFFICE—A. H. Higson, 87 White St., taking bids 1 story, 25 x 50 ft., and 55 x 200 ft., brick, steel, concrete, White St. and Granville Ave. $50,000. Sunderland & Watson, 248 Main St., archts.

Ind., Lafayette—PLANT—Northern Indiana Public Service Co., taking bids brick, steel, tile plant. $60,000. F. P. Riedel, archt.

Ia., Waterloo—PACKING PLANT—Henschen & McLaren, archts., 1637 Prairie Ave., Chicago, Ill., bids about July 1, packing plant for Roth Packing Co. $100,000-$150,000.

Mass., Belmont (br. Boston)—SERVICE and REPAIR—C. Fulginiti, 101 Hull St., taking bids 1 story, 40 x 140 ft., concrete, brick, steel, plain found., Trapelo Rd. $40,000. Private plans. Noted May 2.

Mass., Brookline — SERVICE STATION, STORE and REPAIR SHOP — See "Contracts Awarded."

Mass., Charlestown (sta. Boston)—MANUFACTURING—H. H. Wiggin, Terminal St., taking bids altering and constructing 3 story, basement, 50 x 150 ft., and 30 x 60 ft., brick, timber addition, plain found., 412 Medford St. Warren Eng. Co., 50 Terminal St., engrs.

Mass., Fall River—SERVICE and REPAIR GARAGE—W. E. Fawcett, 1437 Robeson St., taking bids 1 story, irregular sized brick, steel, plain found., North Main St., $40,000. E. M. Corbett, Bedford St., Fall River, archt. Noted June 20.

Mass., Holyoke—FACTORY—Chemical Paper Co., R. Bosworth, taking bids 2 story, 60 x 215 ft., and 60 x 107 ft., brick, concrete, Jackson St. $175,000. Private plans. Noted May 23.

Mass., South Boston (sta. Boston) — INDUSTRIAL—Perkins Institution for Blind, A. Thorndike, treas., 549 East 4th St., taking bids 4 story, basement, 50 x 100 ft., brick, rein.-con., plain found., East 4th St. $100,000. J. Purden, 50 Congress St., Boston, archt. Noted May 2.

Mass., Wayland — SERVICE and REPAIR GARAGE—Town, Bd. Selectmen, taking bids 1 story, stone, steel, tile, plain found., Main St. $40,000. J. R. Worcester & Co., 79 Milk St., Boston, engrs.

Constr. News page 383

Buildings—Industrial (Continued)

Mass., Westfield—STORAGE PLANT—Standard Oil Co. of New York, 26 Bway., New York, taking bids storage plant, North Elm St. Est. $150,000. Private plans. Noted Mar. 14.

N. J., Hackensack—DISTRIBUTING PLANT—See "Contracts Awarded."

N. J., Jersey City — POWER HOUSE and BOILER ROOM — P. Simeone, & Co., Inc., archts. and engrs., 22 Journal Sq., bids about July 15, 1 story, 85 x 100 ft., brick, steel, plain found., 68-72 Liberty Ave., for Brunswick Laundry, 222 Townele Ave. $160,000.

N. J., Passaic — MILL — See "Contracts Awarded."

N. J., Ridgewood—SERVICE STATION—R. Jahelka, archt., 15 West 44th St., New York, taking bids general contract 1 story, basement, brick, steel, plain found., Broad and Essex Sts., for Morris Motors, Inc., c/o architect. $150,000.

N. Y., New York—See "Contracts Awarded."

O., Cleveland—FACTORY, OFFICE and SHIPPING—Cummer Products Co., M. Amster, pres., 2150 West 15th St., taking bids 1 and 2 story, 90 x 360 ft., concrete, brick, steel, Dunham Rd. $225,000. Private plans.

Pa., Minersville—TEXTILE PLANT—H. D. Rob Co., 40 Leonard St., New York, taking bids general contract rebuilding textile plant, Lewis St. and Delaware Ave. $170,000. W. D. Shollenberger, 11 West 4th St., Williamsport, archt.

R. I., Cranston (mail Providence) — FACTORY — Leonard-Rooke Co., 486 Broad St., Providence, taking bids altering and constructing 1 and 2 story, basement, 60 x 100 ft., brick, timber addition, plain found., 1380 Elmwood Ave. $50,000. F. P. Sheldon & Sons, Hospital Trust Bldg., Providence, archts. Noted Feb. 7.

S. D., Pierre—BOILER HOUSE—July 3, by Bd. Managers State Soldiers Home, at office State Engineer, boiler house, incl. boilers, stokers. I. L. Adams, secy.

Contracts Awarded

Ala., Union Springs—MILLS—Cowikee Mills, Inc., D. Comer., pres., 3930 North 1st Ave., Birmingham, 1 story, 54 x 294 ft. yarn mill addition, to Johnson Constr. Co., Martin Bldg., Birmingham. $40,000.

Ark., Arkadelphia—GRAVEL PLANT—Arkadelphia Gravel Co., C. C. Hawkins, pres., gravel production plant, 100 cu.yd. per hr., day labor. $50,000.

Calif., Lodi—PACKING PLANT—Vita Fruit Products Co., Lodi, 1 and part 2 story, concrete, to Davis-Pearce Co., Grant & Weber Sts., Stockton; equipment, to Gay Eng. Co., 333 Market St., San Francisco. Est. $100,000.

Calif., Los Angeles — FACTORY — Standard Paper Box Co., 3837 Moneta Ave., 2 story (ultimately 7 story) 50 x 144 ft., concrete, to Kuhns Constr. Co., 175 West 37th Pl. Noted June 6.

Calif., Oakland — CANNERY — Income Properties Co. of California, 2 story, concrete, foot 9th Ave., to Cahill Bros., 206 Sansome St., San Francisco. $50,000.

Calif., San Francisco—FACTORY and LOFT—California Ink Co., 426 Pine St., 8 story, basement, rein.-con., Sansome and Merchant Sts., to Barrett & Hilp, 918 Harrison St. $400,000.

Conn., Elmwood—FACTORY—Wiremold Co., 410 Asylum St., Hartford, 2 story, 98 x 200 ft., brick, timber, to Bartlett & Brainerd Co., 252 Asylum St., Hartford. Est. $175,000. Noted May 30.

Ill., Chicago—FACTORY—A. Epstein, archt., 2001 West 39th St., masonry contract, alterations and 3 story, 80 x 32 ft. brick addition, 1105 West 35th St., to E. W. Sproul Constr. Co., 2001 West 39th St., for Strauss & Strahm, 1105 West 36th St. Est. $47,000.

Ill., Chicago—SWITCH HOUSE—Holabird & Root, archts., 333 North Michigan Ave., masonry and carpentry contract 3 story, 35 x 159 ft., 1131-35 West 22nd St., to O. Randolph, Inc., 53 West Jackson Blvd., for Commonwealth Edison Co., 72 West Adams St. $300,000.

Ind., Evansville — POWER PLANT — School Comrs., power plant to Gottman & Weber, 23 Main St. Est. $47,000.

Ind., Ft. Wayne—PRINTING PLANT—General Printing Co., general contract 2 story, basement, 50 x 150 ft., brick, rein.-con., steel, to Buesching & Hagerman, 402 East Superior St. Est. $45,000. Noted Apr. 25.

Ind., Indianapolis — FACTORY — Columbia-Conserve Co., Belt R.R. and Churchman Ave., 55 x 217 ft., brick, steel, to E. Weddle, 4050 North Capitol Ave. Est. $41,400.

Ind., Indianapolis — FACTORY — Piel Bros. Starch Co., 1515 South Dover St., 40 x 91 ft., brick, steel, to Brown & Mick, 226 East Michigan St. Est. $43,150.

Ind., Indianapolis—FACTORY—Standard Nut Margarine Co., 1102 Roosevelt Ave., 2 story, basement, 45 x 150 ft., brick, steel, to A. Hedgard, 331 Hampton Dr. Est. $49,000.

Ind., Indianapolis — FACTORY — U. S. Encaustic Tile Co., 359 West 16th St., 60 x 90 ft. brick, steel, to P. A. Noe Co., 526 Lemcke Bldg. Est. $40,000.

Ind., Indianapolis — MACHINE SHOP and GARAGE — W. H. Cook, Southport, 2 story, 76 x 190 ft., brick, rein.-con., to A. V. Stackhouse, 2611 Cornell Ave., est. $50,000.

Ind., Indianapolis—POWER PLANT—Indiana University Hospital, rein.-con. power plant to Krebay Constr. Co., 802 New City Trust Bldg. Est. $150,000.

Constr. News page 384

Ind., Indianapolis—SERVICE STATION and MACHINE SHOP—Lincoln Oil Co., Tibbs Ave. and Washington St., brick, steel, rein.-con., stone, to E. J. Culbertson, 4216 College Ave. Est. $40,000.

Ind., Kokomo—PLANT—J. Dietzen, general contract 2 story, basement, 40 x 150 ft., rein.-con., steel, brick, North Washington St., to Pierce & Collins, 713 Mulberry St. Est. $47,000.

Ind., Michigan City — ELECTRIC GENERATING STATION—Holabird & Root, archts., 333 North Michigan Ave., Chicago, Ill., 2 story, basement, 156 x 405 ft., brick to Herlihy Bros., 228 North LaSalle St., Chicago, Ill., $10,000,000, for Northern Indiana Public Service Co., Hammond. Noted May 23.

Ia., Belmond—SUGAR REFINERY WAREHOUSE—American Beet Sugar Co., Steel Bldg., Denver, Colo., 25 ft. high, 69 x 212 ft., concrete, brick, steel, to M. M. Moen & Co., Mason City. Noted Feb. 28.

Me., Lewiston — FACTORY — Lewiston Bleachery & Dye Works, Lisbon St., 2 story, basement, brick, plain found., Lisbon St. to E. F. Maxim Co., 520 Main St. Est. exceeds $40,000.

Mass., Boston—FREIGHT STATION—New York, New Haven & Hartford R.R. Co., E. Gagel, ch. engr., New Haven, Conn., 1 story freight station with platform, macadam driveways, Rugby Freight Yard, to Simpson Bros. Corp., 77 Summer St.

Mass., Brookline — SERVICE STATION, STORE and REPAIR SHOP—W. Greenwood, 8 Emerson St., 1 story, 125 x 150 ft., brick, rein.-con., steel, plain found., separate contracts. $40,000. Private plans. Noted June 20.

Mass., Chelsea (br. Boston)—WAREHOUSE, GARAGE, etc.—Texas Co., 31 St. James Ave., Boston, 2 story, 40 x 145 ft., brick, concrete warehouse, office, garage, and oil storage, incl. pump, to Simpson Bros., 77 Summer St., Boston. Est. $75,000. Noted June 6.

Mass., Fitchburg—SERVICE GARAGE and REPAIR SHOP—Fitchburg Gas & Electric Co., 655 Main St., 1 story, brick, steel, plain found., to Wiley & Foss, Central St. Est. $40,000-$50,000. Noted June 6.

Mass., Hyde Park—GARAGE, REPAIR SHOP and STOCKROOM—Edison Electric Illuminating Co., 39 Boylston St., Boston, 1 story, basement, 130 x 155 ft., brick, steel, plain found., to W. M. Bailey Co. 88 Broad St., Boston. Noted June 20.

Mass., Lowell — FACTORY — Hub Hosiery Mills, 11 Waterford St., Boston, altering 2 story, brick, timber plain found., Perkins St., to Whidden-Beekman Co., 250 Stuart St., Boston. Est. $50,000.

Mass., Newton—SERVICE and REPAIR GARAGE—Kenmore Realty Co., 15 Deerfield St., Boston, 1 story brick, stone, steel, concrete found., to M. Slotnick, 333 Washington St., Boston. Est. $45,000. Noted Mar. 14.

Mich., Detroit—FACTORY and WAREHOUSE—Peoples Outfitting Co., 150 Michigan Ave., 4 story, part basement, 321 x 600 ft., rein.-con., brick, plain found., West Warren Ave., to Bryant & Detwiler, 2336 Dime Bank Bldg.

Mich., Grand Rapids—CARBIDE GAS—Union Carbide & Carbon Co., 30 East 42nd St., New York, 50 x 60 ft. and 44 x 131 ft. buildings, each 1 story rein.-con., brick, steel, plain found., to John McNabb & Sons, 204 Murray Bldg., $52,000. Noted Apr. 18.

Mo., St. Louis — RAILROAD SHOPS — Terminal Railroad Assn., 1800 Market St., 1 story, 45 x 173 ft., rein.-con., brick, 301 South 18th St., to Dwight P. Robinson & Co., Inc., 125 East 46th St., New York. Est. $45,000.

N. H., Somersworth—POWER STATION—Pub. Serv. Co. of New Hampshire and Central Main Power Co., F. H. Mason, ch. engr., 9 Grange St., Augusta, Me., water power station, to Saunders Eng. Co., 102 Exchange St., Portland.

N. J., Garwood — PLANT — United States Aluminum Co., Centre St., general contract altering and constructing 1 story, basement, 60 x 120 ft., brick, steel plain found., to Wigton-Abbott Corp., 705 Park Ave., Plainfield. $40,000. Noted May 16.

N. J., Hackensack—DISTRIBUTING PLANT—Pub. Serv. Electric & Gas Co., 80 Park Pl., Newark, 2 story, basement, 112 x 202 ft., rein.-con., brick, plain and concrete pile found., separate contracts. $250,000. Pub. Serv. Production Co., 80 Park Pl., Newark, archts. Noted June 20.

N. J., Newark—MACHINE SHOP—Gleby Wire Co., Riverside Ave., general contract 1 and 2 story, basement, 90 x 220 ft., brick, steel, plain found., 152 Riverside Ave., to Austin Co., 120 Bway., New York. Est. $50,000.

N. J., Passaic—MILL—Newport Chemical Wks., Inc., Gregory Ave., 3 story, basement, 50 x 75 ft., brick, steel addition, plain found., River Dr., separate contracts. $40,000. Private plans.

N. Y., New York—BAKERY—J. C. Davies, Inc., 522 Willis Ave., 100 x 162 ft., brick, to P. Murphy, 573 Walton Ave. Est. $65,000. Noted May 23.

N. Y., New York—GARAGE, SERVICE STATION and BOILER HOUSE—New York Central R.R. Co., F. B. Freeman, ch. engr., 466 Lexington Ave., 7 story, 200 x 200 ft., rein.-con., 320,000 sq.ft. floor space, to Turner Constr. Co., Graybar Bldg. Noted June 20.

N. Y., New York—SERVICE GARAGE and LAUNDRY—Agnar Realty Corp., M. D. Strong, pres., 2010 Jerome Ave., 2 story, 150 x 150 ft., brick, concrete, separate contracts. $125,000. Siegel & Levy, 45 West 57th St., archts. Noted May 23.

N. Y., Thiells—POWER PLANT—Commissioner Dpt. Mental Hygiene, Capitol, Albany, general contract power plant addition, to Archer Eng. & Contg. Co., 1457 Bway., New York, $100,000; heating, to R. H. Baker Co., Inc., 101 Park Ave., New York, $209,340; sanitary work, to Worsfold & Hauvermale, Inc., 140 Main St., Nyack, $10,900; electrical work, to O'Connell Electric Co., 63 Mount Hope Ave., Rochester, $13,414. Grand total $333,654. Noted Apr. 25.

N. Y., Yonkers—COLD STORAGE PLANT—S. Steinmetz, 61 School St., 3 story, to Lynch & Larkin, 127 Downing St. Est. $200,000. Noted June 6.

O., Cleveland—FACTORY—Bender Body Co., H. Bender, pres., 1 story, 135 x 175 ft., brick, steel addition, to Albert M. Higley Co., Plymouth Bldg. Est. $150,000. Noted June 20.

O., Cleveland — FACTORY — Midland Steel Products Co., E. J. Julas, pres., West 106th St. and Madison Ave., 1 story, 96 x 116 ft., brick, steel, incl. concrete dock, loading platform and extending crane runway, to W. F. Hendrich Co., 2777 East 53rd St. Est. $70,000.

O., Cleveland—FACTORY and OFFICE—West Side Carpet Cleaning Co., F. Volk, pres., 4005 Bridge Ave., 2 story, 40 x 110 ft., brick, steel, concrete factory and office addition, to Mitzel Co., B. F. Keith Bldg. Est. $40,000.

O., Cleveland—MACHINE SHOP—Midland Steel Products Co., West 106th St., and Madison Ave., 1 story, 45 x 62 ft., 2080 West 106th St., to S. W. Emerson Co., 1836 Euclid Ave. Est. $40,000.

O., Cleveland — REPAIR SHOP — J. Lamb Baking Co., West 50th St. and Lorain Ave., 1 story, 40 x 122 ft., brick, steel, to Super-Built Constr. Co., 1836 Euclid Ave. Est. $40,000.

O., Columbus—FACTORY—Columbus Union Oilcloth Co., H. E. Nesbitt, vice pres., 3 buildings, 1 and 2 story, 200 x 200 ft., concrete, steel, 7th Ave., to M. J. Delaney, 187 Seymour St., $100,000.

Pa., Monongahela—PLANT—Coshocton Iron Wks., 1 story, 160 x 480 ft., brick, steel, concrete addition. $150,000. Owner builds. Private plans.

Tenn., Bristol—PLANT—Mutual Thread Co., 17 West 17th St., New York City, general contract plant, to C. Kearfott, Bristol. Est. exceeds $50,000.

Tex., Austin—SHOP—Bd. Regents, c/o J. W. Calhoun, comptroller, 1 story, brick, hollow tile, steel, rein.-con. engineering shop, to H. E. Wattinger, 401 Paul St., Austin. $118,569. Noted May 23.

Tex., Corpus Christi—COLD STORAGE and ICE PLANT—H. C. Wagner & L. B. Mead, 1515 Water St., 70,000 cu.ft. cold storage plant and 20 ton ice plant. To operate under name Port Ice & Storage Co. Owner builds.

Buildings—Residential

Residential building projects at stages earlier than Bids Asked have been omitted from this issue. You may have the list of these 22 jobs, free of charge, by writing or wiring—

CONSTRUCTION NEWS

Engineering News-Record, Tenth Ave. at 36th Street, New York, N. Y.

Bids Asked

Calif., San Francisco — See "Contracts Awarded."

Mass., Malden (br. Boston)—See "Contracts Awarded."

N. J., Cliffside—W. Mayer, Jr., archt., 711 Bergenline Ave., West New York, bids about July 15, general contract 2 story, basement, brick, steel, Anderson Ave. and Crescent Lane, for Cliffside Park Title Guarantee & Trust Co., Grantwood. Est. $150,000. Noted June 6.

N. J., Jersey City—See "Contracts Awarded."

N. J., Jersey City—P. L. Schultz, archt., 256 Summit Ave., bids about Aug. 1, general contract 11 story, basement, 50 x 165 ft., brick, steel, plain found., 327-33 Fairmount Ave., for steel, plain found., 327-33 Fairmont Ave. $250,000. Noted Mar. 7.

N. J., Paterson—D. J. Scoteco, archt., 60 Park Pl., Newark, bids about July 15, 9 story, basement, 50 x 142 ft., brick, steel, plain found., 226 Bway., for A. L. Hoffspiegel, 282 Bway. $450,000. Noted May 30.

Buildings—Residential (Continued)

N. Y., New York—See "Contracts Awarded."

N. Y., Stapleton (sta. Staten Island) — B. Singer, archt., 921 Bergen Ave., bids about July 1, 6 story, basement, 100 x 115 ft., brick, steel, Ward and Bayview Aves., for Owner, c/o architect. Noted June 20.

O., Cleveland — L. Cahn, 2099 Lambertson Rd., taking bids 4 story, basement, 136 x 138 ft., brick, 10003 Lake Ave. $250,000. A. Sogg, B. F. Keith Bldg., archt.

O., Cleveland—July 1, by Shaker Co., c/o C. L. Bradley, Terminal Tower, 3 story, basement, concrete, brick, steel, Shaker Sq. $600,000. Philip Lindsley Small & Associates, Terminal Tower, archts.

Tex., Dallas — July 10, by Bryan & Sharp, archts., 707 Constr. Ind. Bldg., 4 story, part basement, 90 x 97 ft., negro Y.M.C.A. building, brick, rein.-con., plain found., Flora and Ball Sts., for Y.M.C.A., c/o W. A. Scott, secy. $140,000-$150,000.

B. C., Vancouver—See "Contracts Awarded."

Ont., Guelph—A. W. Cutten, c/o C. L. Dunbar, Douglas St., bids about July 20, concrete, steel hotel, theatre and garage, Wyndham St. $1,000,000. B. H. Marshall, 612 Sheridan Rd., Chicago, Ill., archt. Noted May 30.

Contracts Awarded

Calif., Long Beach—Dickard & Landis, 6 story, basement, 66 x 89 ft., rein.-con., to C. A. Tornell, Jr., 200 West Ocean Ave., $175,000. Noted June 20.

Calif., Los Angeles—D. L. Edmonds, 122 North Mansfield Ave., 4 story, basement, brick, concrete, North Normandie Ave., to P. Elvad, 4328 Amesbury Rd., $165,000.

Calif. San Francisco—N. J. Nelson, 354 29th Ave., 6 story, basement, rein.-con., Buchanan & Haight Sts., day labor. $165,000. Private plans.

Fla., Ft. Lauderdale—W. A. Bennett, archt., 14 Real Estate Bldg., Miami, 5 and 6 story, tower, 140 x 224 ft., stucco on hollow tile hotel, to Sandquist & Snow, 417 Calumet Bldg., Miami, for Ft. Lauderdale Hotel Co. Est. $750,000. Noted Mar. 14.

Ia., Des Moines—F. W. and J. W. Hubbell, Army Post Rd., 12 story, basement, 130 x 132 ft., rein.-con., brick, stone, Walnut and 4th Sts., to H. L. Stevens Co., 30 North Michigan Ave., Chicago, Ill. Est. $750,000. Tangunay & McGinn Hotel Co., 207 West 5th St., Waterloo, lessee.

Ind., Anderson—Madison Realty Co., 8 story, 36 x 144 ft., brick, steel, rein.-con., plain found., 9th and Meridian Sts., to Boynham Co., 609 Chamber of Commerce Bldg., Indianapolis. $475,000. Noted Apr. 18.

Mass., Malden (br. Boston)—Fellsway Realty Trust Nesson & Rossman, 73 Cornhill, Boston, 3 story, basement, brick, stone, separate contracts. $200,000. Private plans.

N. J., Jersey City—H. Lupin, 153 West 9th St., Bayonne, 4 story, basement, brick, steel, plain found., 175-77 Arlington Ave., separate contracts. $150,000. C. I. Goldberg, 921 Bergen Ave., archt. Noted June 13.

N. Y., New York—Claremont Parkway Corp., 1440 Bway., 6 story, 200 x 280 ft., brick, timber, 164th St., Walton and Gerard Aves., separate contracts. $1,000,000. Gronenberg & Leuchtag, 1385 Bway., archts. Noted May 23.

N. Y., New York—E. Ellinger, 16 East 52nd St., bids in August, separate contracts, 325 East 53rd St. To exceed $1,000,000. J. M. Felson, 250 West 57th St., archt.

N. Y., New York—Saulmaek Realty Corp., J. H. McNally, pres., 1860 Bway., separate contracts. $150,000. N. Rotholz, 122 East 42nd St., archt. Noted May 23.

N. Y., New York—B. Winter, Inc., 250 Park Ave., altering Hotel Bretton Hall, Bway. and 85th St., to J. Meenan, 153 West 72nd St. Est. $250,000.

O., Cleveland—M. J. McArthur, 1940 East 82nd St., 3 story, basement, brick, Lake Ave., to J. Naft, 1520 Holyoke Ave. Est. $300,000.

Pa., Phila.—BeeBee Constr. Co., Fox Bldg., 4 story, basement, 135 x 360 ft., brick, steel, plain found., Oxford and Fillmore Sts. Owner builds. G. H. Murphy, Frankford and Orthodox Sts., archt.

B. C., Vancouver—West Coast Builders Ltd., 4850 Counaught Dr., 5 story, basement, 117 x 118 ft., rein.-con., plain found., day labor. $200,000. Noted Jan. 17.

Ont., Sarnia—Sania Development Co., G. H. Gabler, interested, 9 story, basement, brick, steel, stone hotel, Christina St., to John V. Gray Constr. Co., 1602 Northern Ontario Bldg., Toronto. Est. $550,000.

Buildings—Educational, Religious

Bids Asked

Mass., Concord — DORMITORY — Middlesex School, F. Windsor, taking bids 4 story, basement, irregular sized, brick, plain found. $150,000. Strickland, Blodgett & Law, 20 Newbury St., Boston, archts.

Conn., Hamden (br. New Haven)—SCHOOL—Town, School Bd., Hamden, taking bids 2 story, basement, brick, steel, incl. library, offices, classrooms, assembly hall, Whitney Ave. $150,000. A. W. Boylen, 30 Whitney Ave., New Haven, archt. Noted Mar. 21.

Conn., Meriden—SCHOOL—Bd. Educ. taking bids 2 story, basement, brick, trade school, plain found., $150,000. L. Hamilton, 22 Church St., archt. Noted Feb. 21.

Conn., Storrs—LABORATORY—July 5, by Connecticut Agricultural College, 2 story, basement, brick, steel, pathological laboratory, $150,000. D. K. Perry and E. K. Bishop, 17 Court St., New Britain, archts.

Ind., Speedway (mail Indianapolis)—SCHOOL—July 11, by Bd. School Trustees, at office of Allison Eng. Co., remodeling and constructing additions. $150,000. McGuire & Shook, 941 North Meridian St., Indianapolis, archts. Noted Apr. 18.

Ia., Ottumwa—CHURCH and PARSONAGE—July 15, by St. Marys Catholic Congregation, J. M. Walsh, pastor, 1 story, basement, 53 x 143 ft., rein.-con., brick, stone. $150,000. C. I. Krajewski, Dubuque, archt. Noted June 6.

Me., Auburn—HIGH SCHOOL—July 1 (extended date), by City, G. R. Gardner, supt., 2 story, 70 x 200 ft., brick, steel addition to Edward Little High School. $200,000. Miller & Beal, 465 Congress St., Portland, archts. Noted June 13.

Mich., Muskegon Heights—SCHOOLS—July 2, by Bd. Educ., two 2 story, basement, rein.-con., brick, steel, plain founds. $325,000. Pond & Pond, Martin & Lloyd, 180 North Michigan Ave., Chicago, Ill., engrs. and archts. Noted June 6.

Mass., Boston—SCHOOL—July 15, by Dpt. Educ., State House, Normal Art School, 4 story, basement, 175 x 260 ft., brick, limestone, steel, plain found. $450,000. Henry & Richmond, 12 West St., archts. Separate bids for heating, ventilating, electrical work, etc., $110,000. Noted May 23.

Mass., Hyde Park — SCHOOL — July 1, by Schoolhouse Dpt., Boston, altering William Barton Rogers School, 2 story, basement, brick, limestone, plain found. $150,000.

Mass., Maynard—SCHOOL—Town, c/o R. H. Doane, archt., 60 Batterymarch St., Boston, taking bids altering and constructing 2 story, brick, stone addition, plain found. Oak St. $150,000.

Mass., Taunton—SCHOOL—Immaculate Conception Roman Catholic Parish, J. O. Reilly, pastor, 387 Bay St., taking bids 2 story, base ment, brick, plain found. $150,000. J. I. Higgins, Borden Blk., Fall River, archt. Noted May 2.

Mass., Taunton—HIGH SCHOOL—July 3, by City, Pub. Property Com., 2 story, basement, brick, stone addition, plain found., Washington St. $150,000 or more. J. I. Higgins, Borden Blk., Fall River, archt. Noted Feb. 28.

Mich., Battle Creek — LIBRARY — L. J. Sarvis, archt., 63 East Main St., taking bids and open same about July 3. 2 story, basement, 132 x 160 ft., rein.-con., brick, steel, plain found., for City. $250,000.

Mo., Webster Groves—SEMINARY—July 9, H. P. Hess, archt., 1001 Ambassador Bldg., St. Louis, 3 and 4 story, basement, rein.-con., brick, stone seminary with 160-ft. tower, near Watson Rd. at intersection Laclede Station Rd., for Catholic Archdiecese of St. Louis, J. J. Glennon, 4510 Lindell Blvd., St. Louis. $1,250,000.

N. H., Claremont—CHURCH—Methodist Episcopal Church Society, F. J. Andrews, pastor, 16 Grant St., taking bids 1 and 2 story, basement, brick, stone, plain found., Franklin and Sullivan Sts. $150,000. Methodist Bureau of Architecture, 1710 Arch St., Phila., Pa., archts. Noted Mar. 7.

N. J., Convent—NUN'S HOME—Myers, Bigelow & Shanley, archts., 24 Walnut St., Newark, bids about July 1, 4 story, basement, brick, steel, plain found., for College of St. Elizabeth, Convent Station. $300,000. Noted June 13.

N. J., East Orange—CHURCH—Ludlow & Peabody, archts., 101 Park Ave., New York, taking bids general contract altering and constructing 2 story, basement, 85 x 188 ft., brick, steel addition, plain found., Oraton Parkway and Main St., for First Presbyterian Church, 3 Hawthorne St. $150,000. Noted Dec. 27.

N. J., Jersey City—CONVENT and CHAPEL—July 1, by N. J. Convery, archt., 32 Walnut St., Newark, 3 story, basement, brick, steel, plain found., Greenville Ave., for St. Pauls Roman Catholic Church, Greenville Ave. Est. $200,000. Noted June 13.

N. J., Newark—ORPHANAGE—Daughter of Israel Hebrews Orphan Sheltering Institution, Homestead Park, and L. Kasoff, archt., 164 Market St., bids about July 1, general contract 8 story, basement, 80 x 140 ft., brick, steel, 12 Homestead Park. $150,000. Noted June 21.

N. J., Newark—SYNAGOGUE—Anshe Russian Congregation, B. Brody, pres., 153 Stratford Pl., bids about July 15, 3 story, basement, brick, steel, plain found., Schuyler and Shepard Aves. $300,000. E. Gerber, 786 Broad St., archt. Noted May 30.

N. J., Plainfield—HIGH SCHOOL—Bd. Educ., 119 West 9th St., bids about Aug. 1, 2 story, basement, brick, steel addition, plain found., West 9th St. $175,000. J. T. Rowland, Jr., 30 Journal Sq., Jersey City, archt. Noted Apr. 25.

N. J., Riverdale—SCHOOL—Bd. Educ., Town Hall, bids about July 15, 2 story, basemen brick, steel, plain found. $150,000. Rasmussen & Wayland, 36 West 47th St., New York archts. Noted June 6.

N. J., Sayreville—SCHOOL—July 9, by Bd. Educ., Boro Hall, 2 story, basement, brick, steel plain found., Dane St. $150,000. A. Merchant 1 Elm Row, New Brunswick, archt. Noted June 13.

N. J., Westfield—SCHOOL—July 9, by Bd. Educ., Clark St., 2 story, basement, brick, steel, rein.-con., plain found. $150,000. Coffin & Coffin, 522 5th Ave., New York, archts. Noted Apr. 11.

N. Y., Buffalo—SCHOOLS—July 18, by Bd. Educ., Genesee Bldg., additions to School 17, 1820 Main St., School 48, 124 Edna St., and School 33, 557 Elk St., D. S. McNeill, 1411 Genesee St., archt. Noted July 26 and Aug. 2.

N. Y., Garden City—SCHOOL—July 15, by Bd. Educ., school, $400,000. Starrett & Van Vleck, 393 7th Ave., New York, archts.

N. C., Durham—DORMITORY—July 2, by President and Trustees, North Carolina College for Negroes, brick, concrete, dormitory, Fayetteville St. $150,000. Atwood & Nash, Inc., Chapel Hill, archt.

O., Euclid (br. Cleveland)—SCHOOL — July 15, by Bd. Educ., G. C. Witmer, clk., 1550 Chardon Rd., 3 story, basement, 120 x 144 ft., concrete, brick, steel, 1520 Chardon Rd. $300,000. Fulton & Taylor, 3120 Euclid Ave., Cleveland, archts.

O., North Olmsted (br. Cleveland) — HIGH SCHOOL — July 10, by Bd. Educ., C. J. Oetzel, clk., 2 story, basement, 72 x 200 ft., brick, steel, concrete, Butternut Ridge Rd. $250,000. Walker & Norwick, 3rd and Main Sts., Dayton, archts. Noted Feb. 14.

Pa., Phila.—SCHOOL—July 1, by G. I. Lovatt, archt., 220 South 16th St., 2 story, basement, 100 x 120 ft., steel, stone, plain found., Conshocken, 2nd and Fayette Sts., for St. Matthew's Roman Catholic Church. P. J. Gallagher, pastor. $200,000.

Vt., Springfield—HIGH SCHOOL—July 1, by Town, Superintendent Schools, and Haynes & Mason, archts., 280 Main St., Fitchburg, Mass., 2 story, basement, brick, plain found. $150,000 or more. Noted Apr. 25.

Contracts Awarded

Conn., Plainfield—SCHOOL—St. Joseph's Parish, J. H. Landry, pastor, 2 story, basement, 50 x 85 ft., brick, steel, concrete, limestone, to E. E. Gilbert, Jewett City. Est. $150,000. Noted May 9.

Ind., Beech Grove—HIGH SCHOOL—School Comrs., general contract brick, steel, to N. I. Kerd, Bedford. Est. $150,000. Noted May 23.

Ind., West Lafayette — CHEMISTRY and PHARMACY—Purdue University, 3 story, basement, 190 x 250 ft., rein.-con., brick chemistry and 3 story, basement, 50 x 130 ft., brick, steel pharmacy bufldings, to G. W. North Constr. Co., 9th and Tippecanoe, Terre Haute. Est. $325,000 and $150,000 respectively. Noted May 2.

Me., Presque Isle—NURSES HOME—Northern Maine Sanatorium, 2 story, basement, brick, stone, plain found., to N. W. Downing Co., Presque Isle. Est. $150,000. Noted June 13.

Me., Waterville — CHURCH — Sacred Heart Roman Catholic Parish, M. E. Curran, pastor, 1 story, basement, brick, stone, plain found., to W. H. McPherson, 6 Webster Ave., Bangor. Est. $150,000. Noted May 23.

Md., Catonsville (br. Baltimore)—ADMINISTRATION—W. W. Emmart, archt., Union Trust Bldg., 3 story, 66 x 177 ft., brick, steel addition, to Frainie Bros. & Haigley, 19 West Franklin St., for St. Charles College, E. F. Harrigan, in charge. Noted June 13.

Mass., Whitinsville — CHURCH — Trinity Church, H. R. Rogers, 1 story, basement, 75 x 100 ft., brick, stone, plain found., to T. J. McMahon 460 Concord Ave., Framingham. Est. $150,000. Noted May 2.

Mich., Detroit—SCHOOL—St. Edwards Parish, Crane and Charlevoix Aves., 2 story, basement, 88 x 208 ft., rein.-con., brick, steel, stone, plain found., Crane Ave., to Hutter Constr. Co., Fond du Lac, Wis. Est. $150,000.

Mo., St. Joseph—SCHOOLS—Bd. Educ., A. L. Loving, secy., to S. Hotchkiss, 18th and Penn Sts., altering and constructing additions to Noyes School $1,425, Floyd School $847, Washington School $24,768; to C. H. Hellums, 718 Massant St., Neeley School $860, Maxwell School $1,730; to Batsell & George, 601 North 4th St., McKinley School $34,698, to T. W. Hackett Constr. Co., 1023 Church St., Lafayette School $61,660; to P. P. Duddy Building & Constr. Co., 501 Main St., Humboldt School $33,749; to C. P. Norris, 1708 South 8th St., Wyatt School $1,515; to S. E. Schultz, Chillicothe, Bartlett School $48,650; to N. W. Lawnorn Constr. Co., 110 North Main St., Benton School $40,578. Grand total $289,537. Noted May 23.

N. H., Berlin—CHURCH—Berlin Episcapol Church, L. W. Hooden, 1 story, basement, brick, stone; plain found., to H. P. Cummings Constr. Co., 14 Prospect St., Ware, Mass. Est. $150,000. Noted May 9.

N. J., Hoboken—SCHOOLS—Bd. Educ., P. S. 4, Park Ave., general contract altering 3 story, basement, schools, to Harris Bros., Inc., 84 River St., $34,720; heating, to J. P. Murphy, 24 Journal Sq., Jersey City, $93,410. Noted June 6.

N. J., Hudson Heights — CHURCH and SCHOOL—M. L. Waeber, archt., 606 Washington Ave., Dunnellen, general contract 3 story, basement, 56 x 100 ft., brick, steel, plain found., to Sobray Whitcomb Co., 105 West 40th St., New York, for Sacred Heart Roman Catholic Parish, Barr Pl. Est. $150,000. Noted May 23.

Constr. News page 385

Buildings—Educational, Religious (Cont.)

N. J., Passaic—CHURCH—First Presbyterian Church, c/o H. L. Walker, archt., 144 East 54th St., New York, general contract 2 story, basement, brick, steel, plain found., to J. Lowry, Inc., 270 Madison Ave., New York. Est. $350,000. Noted May 16.

N. J., Paterson—NURSES HOME—Paterson General Hospital, Market St., general contract 3 story, basement, brick, steel addition, plain found., Madison Ave. and Oakes Sts., to J. H. Steele & Son, 48 North 2nd St. Est. $150,000.

N. Y., Glen Cove — SCHOOL — Bd. Educ., school, to J-o-h-n-s Corp., 184 15th St., Brooklyn, $200,000. Noted May 30.

N. Y., White Plains—SCHOOL—Bd. Educ., school addition, to Cuzzi Bros., Palmer Rd., Yonkers. Noted Mar. 14.

O., Akron — SCHOOL — Bd. Educ., George Barber School, 3 story basement, 70 x 230 ft., brick, steel, concrete, to D. W. Smith, Ohio Bldg., $195,000. Noted May 23.

O., Ashland — EDUCATIONAL — Ashland Methodist Church, brick, steel, adjoining present church, to Melbourne Constr. Co., 116 Cleveland Ave. N. W., Canton. Noted June 13.

O., Columbus—COLLEGE—Josephinum College, 821 East Main St., 4 story, basement, 92 x 700 ft., with 180 ft. tower, brick, north of here, to Mathew Rauen Co., 326 West Madison St., Chicago, Ill., $800,000.

Okla., Tulsa — FINE ARTS — University of Tulsa, c/o J. D. Finlayson, 6th and College Sts., 2 story, basement, 38 x 168 ft., to W. S. Bellows Constr. Co., Herkowitz Bldg., Oklahoma City. Est. $150,000.

Pa., Glen Riddle — CONVENT — Sisters of 3rd Order St. Francis, 3.5 story, basement, brick, steel, plain found., to J. McShain, 1610 North St., Phila. Est. $150,000.

Pa., Phila.—SCHOOL—Bd. Educ., 19th and Ludlow Sts., general contract 3 story, basement, 130 x 176 ft., rein.-con., brick, Wright and Umbria Sts., to R. S. Herzog, 10 South 18th St., $384,283; heating, to Mechanical Co., 214 South 12th St. $44,244. Noted May 23.

Pa., Phila.—SCHOOL—Bd. Educ., J. D. Cassell, supt. buildings, 19th and Ludlow Sts., general contract 3 story, basement, 130 x 176 ft., rein.-con., brick, plain found., 44th and Aspen Sts., to R. S. Herzog, 10 South 18th St., $333,339; heating, to Mellon Co., 4415 Ludlow St., $48,887.

Pa., Phila.—SCHOOL—Our Lady of Pompeii, J. Lazza, pastor, 632 West Erie Ave., 3 story, basement, 56 x 100 ft., brick, steel, plain found., to W. R. Dougherty, 1608 Sansom St. Est. $150,000. Noted May 16.

Pa., State College—MAIN—C. Z. Klauder, archt., 1429 Walnut St., Phila., 4 story, basement, 91 x 233 ft., rein.-con., brick, steel, plain found., to H. E. Baton, 1713 Sansom St., Phila., for Penn State College. Noted June 6.

Tex., Harlingen—HIGH SCHOOL—School Bd. O. N. Joiner, pres., 2 story, 180 x 220 ft., brick, rein.-con., concrete found., to W. A. Velton, Brownsville, $229,800. Noted May 16.

Ont., Sandwich—SCHOOL—Bd. Educ., W. J. McArthur, chn., 331 Patricia Rd., Marlborough School, 2 story, basement, 65 x 140 ft., rein.-con., brick, steel, stone, incl. gymnasium, to Border Constr. Co., Imperial Blk., Walkerville, $180,000. Noted Apr. 25.

Buildings—Commercial

Proposed Work

Mich., Plymouth—PRISON INSTITUTION—Detroit House of Correction, 1441 Alfred St., Detroit, plans by A. Kahn, 1000 Marquette Bldg., Detroit, institution buildings, incl. 4 cell blocks, dormitory buildings, work shops, hospital, kitchen, dining hall, administration building, rein.-con., brick, steel, stone, plain found., Phoenix Rd. $1,250,000. Noted Apr. 12, 1928.

N. J., East Orange—BANK—Ampere Bank, 227 North 18th St., 2 story, basement, brick, steel, plain found. $150,000. Maturity after Aug. 1. Holmes & Winslow, 153 East 38th St., New York, archts. Noted June 6.

N. J., Jersey City—GARAGE and SHOWROOM—C. Shilowitz, archt., 26 Journal Sq., soon lets general contract 3 story, basement, 150 x 230 ft., brick, rein.-con., plain found., Sip and Summit Aves., for J. Goldenberg, 80 Woodland St., Englewood, $500,000. Noted June 13.

N. J., Newark—CLUB and STORE—Scandia Building Assn., Inc., c/o E. Pedewquist, secy., 123 North Park St., East Orange, revised plans by W. L. Finne, 91 Broad St., Elizabeth, 3 story, basement, 52 x 100 ft., brick, steel, plain found., 1st and New Sts. $150,000.

N. J., Newark—THEATRE—Owner, c/o H. I. Sohn, archt., 58 Park Pl., sketches brick, steel, plain found., Elwood Ave. $350,000.

N. J., Newton—HOSPITAL—Newton Hospital Assn., E. W. Mevian, 92 Spring St., sketches by Crowe, Lewis & Wicks, 200 5th Ave., New York, 2 story, basement, brick, steel, plain found., on 20 acre site, High St. $450,000. Noted May 30.

N. J., Perth Amboy—BANK and OFFICE—Owner, c/o J. N. Pierson & Son, archts., 205

Constr. News page 386

Park Ave., Plainfield, sketches 10 story, basement, rein.-con., brick, steel, plain found., New Brunswick Ave. and State St. $250,000.

N. Y., Flushing—OFFICE—H. E. Whittemann, lessee, 188 Montague St., Brooklyn, plans by W. I. Hohauser, 17 West 44th St., New York, 10 story, Main and Locust Sts. $1,000,000. M. Klein, 65 Court St., Brooklyn, engr.

N. Y., New York—OFFICE—Brandish Johnson Estate, 50 Bway., plans by W. Whitehall, 1071 6th Ave., 20 story, 93 x 103 ft., brick, steel, 259 West 14th St. $1,000,000.

N. Y., New York—OFFICE—J. Medvin, 134 West 34th St., plans by R. H. Segal, 475 5th Ave., 12 story, 22 x 99 ft., brick, steel, 134 West 34th St. $200,000.

N. Y., New York—OFFICE and BANK—Feamount Realty Corp., C. W. Gerstenberg, pres., 70 5th Ave., plans by Becker & Levy, 349 East 149th St., 12 story, 50 x 86 ft. office and bank building, 340 East 149th St. $550,000.

N. Y., New York — STORAGE, STORE and OFFICE—Henry Gilsay, Huntington, plans by L. Champam, 188 Montague St., Brooklyn, 10 story, 105 x 132 ft., brick, steel, 1193 Bway. $800,000.

N. Y., Port Chester—HOSPITAL—By United Hospital of Port Chester, Boston Rd., soon lets contract hospital, Boston Rd. $150,000. Hood Godley & Foullhoux, 40 West 44th St., New York, archts. P. C. Quinlard, 18 East 48th St., New York, consult. engr. Jaros & Blume, 116 West 39th St., New York, heating and ventilating engrs.

Ore., Portland—STORE—Meyer Frank Co., 6th and Morrison Sts., plans by De Young, Rosenburg & Moscowitz, 11 East 44th St., New York, and H. Brookman, Henry Bldg., 10 story, double basement, 70 x 100 ft. addition. $2,000,000. Maturity spring 1930.

Pa., Phila.—OUT PATIENTS—Jefferson Hospital, 10th and Chestnut Sts., plans by H. Trumbauer, Land Title Bldg., Curtis Clinic, 8 story, basement, tower, rein.-con., brick, steel, plain found., 10th and Walnut Sts. $1,000,000.

Ont., London—OFFICE—Huron & Erie Mortgage Corp., M. Aylesworth, genl. mgr., office, $1,000,000. Engineer and architect not selected.

Bids Asked

Calif., Porterville — MAUSOLEUM — C. N. Aldrich, archt., Pacific Southwest Bank Bldg., Long Beach, taking bids rein.-con. mausoleum for Lanakin & Jameson, c/o architects. $150,000. Noted Apr. 18.

Conn., Hartford—WAREHOUSE—G. Fox & Co., Inc., 956 Main St., Hartford, bids about July 15, 8 story, 150 x 150 ft., rein.-con., Morgan and Talcott Sts. $400,000. Abbott Merkt Co., 175 5th Ave., New York, archts.

Ill., Chicago—OFFICE and STORE—Loebl, Schlossman & De Muth, archts., 612 North Michigan Ave., bids about July 10, 16 story, basement, 80 x 170 ft., brick, steel, 209 South Wabash Ave., for J. R. Thompson Co., 350 North Clark St. $1,500,000.

Ill., Chicago—OFFICE and STORE—Thielbar & Fugard, archts., 219 East Superior St., taking bids 32 story, basement, 80 x 150 ft., rein.-con., brick, steel, caisson found., Wells and Lake Sts. for Trustees System Discount Co., 63 East Adams St. $2,500,000. Noted June 20.

Ind., Ft. Wayne—BANK and OFFICE—July 5, by A. M. Strauss, archt., 415 Cal-Wayne, 22 story, basement, 85 x 150 ft., rein.-con. steel, for Lincoln Bank Co. $1,000,000. Noted May 2.

Mass., Brockton—BANK—Security Co-operative Bank, B. B. Winslow, chn. building com., 83 Main St., taking bids 1 story, basement, brick, concrete, steel, plain found. $150,000. R. E. Jackson, 106 Main St., archt. Noted June 20.

Mass., Leeds — SANATORIUM — July 2, by Comrs. Hampshire Co., Northampton, altering and constructing 2 story, basement, 2 wings, various sizes, brick, steel, concrete, addition, plain found., incl. grading, excavating, concrete footings, etc. $150,000. S. D. Frank, 161 South St., Northampton, archt.

Mass., Maynard — BANK — Assabet Institute for Savings, c/o Hutchins & French, 11 Beacon St., Boston, taking bids 1 story, basement, brick, stone, concrete, steel, plain found. $150,000.

Mass., New Bedford—STORE and OFFICE—R. Fay, 33 Buttonwood St., taking bids 3 story, basement, 100 x 135 ft., brick, stone, plain found., Union and 2nd Sts. $150,000 or more. Former bids rejected. Private plans. Noted Oct. 18.

Mass., Pittsfield—BANK—June 28, by Agriculture Natl. Bank, 100 North St., altering and constructing addition. $150,000. Halsey, MacCormack & Helmer, 286 5th Ave., New York, archts.

Mass., Quincy—STORE and OFFICE—July 1, by Blackall, Clapp & Whittemore, archts., 31 West St., Boston, 4 story, basement, irregular sized, brick, stone, plain found., Maple St., for E. L. Jackson, c/o architects. $150,000 or more.

Minn., Duluth—STORE—June 30, by G. G. Martley Estate, 740 East Superior St., 3 story, basement, brick, steel, plain found., Superior and East 2nd Sts. $170,000. Gilluson & Ellingson, 611 Torrey Bldg., engrs. Noted May 2.

Neb., Omaha—PASSENGER STATION—July 9, by Graham, Anderson, Probst & White, archts., 80 East Jackson Blvd., Chicago, Ill., altering and constructing 2 story addition, 10[illegible] and Jones Sts., for Chicago, Burlington & Quincy R.R. Co., A. W. Newton, ch. engr., Chicago, Ill. Noted Apr. 18.

N. J., Bayonne—MUNICIPAL—Bd. Comrs., City Hall, bids about Aug. 1, 4 story, basement, brick, steel, plain found., Avenue C between 27th and 28th Sts. $250,000. P. A. Vivarttas, 110 48th St., Union City, archt. Noted May 30.

N. J., Elizabeth—BANK—Oakley & Son, archts., 1259 Clinton Pl., taking bids general contract 2 story, basement, brick, steel, plain found., 609 Westfield Ave., for Elmora State Bank, 605 Westfield Ave., $150,00. Noted June 13.

N. J., Elizabeth—POLICE HEADQUARTERS—Bd. City Comrs., City Hall, bids about July 1, 2 and 3 story, basement, 60 x 150 ft., brick, steel, plain found., Catherine and Morell Sts. $250,000. L. Quien, Jr., 229 Broad St., archt. Noted May 30.

N. J., Jersey City—BANK—Commercial Trust Co. of New Jersey, 15 Exchange Pl., bids about July 15, general contract altering and constructing 3 story, basement, brick, steel addition, plain found., 638 Newark Ave. $150,000. W. Neumann, 40 Journal Sq., archt. Noted June 13.

N. J., Montclair—CLUB—Owner, c/o A. G. Brach, archt., 60 Park Pl., Newark, bids about July 15, general contract 2 story, basement, 150 x 200 ft., brick, steel, plain found. $200,000. Noted June 6.

N. J., Newark—CLUB—W. Lehman, archt., bids about July 1, revised 4 story, basement, 70 x 100 ft., brick, steel, plain found., 37-41 Fulton St., for Progress Club, M. Scheck, pres., 11 West Park St., $500,000. Noted May 30.

N. J., Passaic—GARAGE and SHOWROOM—F. P. Friedman, archt., 395 Springfield Ave., Newark, bids about July 15, 1 story, basement, 140 x 150 ft., brick, steel, plain found., 102-08 Gregory Ave., for A. Garth, 14 Grove St. $150,000. Noted May 30.

O., Cleveland—POSTAL SUB-STATION—M. A. Bradley Estate, 1276 West 3rd St., taking bids 2 story, basement, 100 x 200 ft., concrete, brick, steel, Ontario St. $200,000. W. S. Lougee, Marshall Bldg., archt.

Ore., Portland—OFFICE—A. E. Doyle, archt., Pacific Bldg., bids about Sept. 13, 27 story, double basement, 100 x 200 ft., rein.-con., steel, solid rock found., West Park and Washington Sts., for Selling, Hirsch & Sichel Co., Portland. $1,600,000.

Pa., Mt. Lebanon (mail Pittsburgh)—MUNICIPAL—July 1, by W. H. King, Jr., archt., Magee Bldg., Pittsburgh, 3 and 5 story, basement, 96 x 100 ft., brick, steel, hollow tile, stone, Washington Rd., for Bd. Twp. Commissioners. $175,000.

Tex., Childress—BANK and OFFICE—First National Bank, J. M. Crews, vice pres., bids about Aug. 1, 5 story, basement, 50 x 115 ft., brick, steel, concrete found., Commerce St. and Ave. B. $300,000. W. C. Hedrick, 1st Natl. Bank Bldg., Ft. Worth, archt.

Tex., Waco—THEATRE—A. C. Finn, archt., 505 Bankers Mortgage Bldg., Houston, taking bids brick, steel, stone, concrete found., 7th and Washington Sts., for J. H. Jones & J. A. Colvin, Bankers Mortgage Bldg., Houston. $350,000.

Ont., Halleybury—HOSPITAL—Sisters de la Misericorde, Montreal, bids about July 1, 4 story, basement, 65 x 165 ft., rein.-con., brick, steel, incl. laundry, power units, Main St. $150,000. Viau & Venne, 59 St. James St., Montreal, archts.

Ont., London—OFFICE—O. R. Moore, St. James Apartments, bids about June 29, 8 story, basement, 68 x 150 ft., brick, steel, stone, Dundas St. $350,000. John M. Moore & Co., 489 Richmond St., archts.

Ont., Weston—HOSPITAL—R. Collinge, archt., 71 King St. W., Toronto, taking bids 1 and 3 story, rein.-con., brick, steel, stone addition, for Toronto Hospital for Consumptives, 223 College St., Toronto. $185,000.

Contracts Awarded

Calif., Pittsburg—THEATRE and HOTEL—C. A. McCourt, 556 Jones St., 3 story, basement, stucco, Railroad Ave. and 7th St., to H. C. Knight, 1819 Franklin St., Oakland. Est. $150,000.

Calif., Whittier—HOTEL—A. Wardman, 131 North Bright Ave., 4 story, basement, rein.-con., to Wheatland Constr. Co., Whittier. $165,000.

Conn., Norwalk—BANK—Fairfield County Savings Bank, J. H. Gregory, pres., brick, steel, to T. J. Pardy Constr. Co., 1481 Seaview Ave., Bridgeport. Est. $150,000. Noted May 9.

Conn., Stamford — BUSINESS — Fairfield County Realty Associates, W. N. Maguire, pres., 1st Stamford Natl. Bank, 5 story, brick, steel, to United Engineers & Constructors, Inc., 125 East 46th St., New York. Est. $200,000. Contractors taking bids on sub-contracts. Noted June 20.

Conn., Torrington — HOSPITAL — Charlotte Hungerford Hospital, T. W. Bryant, 6 story, brick, steel unit, to Torrington Building Co., 182 Church St. Est. $500,000. Noted May 23.

Ill., Chicago—OFFICE—Loebe, Schlossman & De Muth, archts., 608 North Michigan Ave., 10 story, basement, concrete, brick, steel, to Lundoff-Bicknell Co., B. F. Keith Bldg., Cleveland.

Buildings—Commercial (Continued)

O., for Four Hundred Thirty North Michigan Ave. Building Co., c/o contractor. Est. $500,000. Noted May 16.

Ill., Chicago—OFFICE and WAREHOUSE—Syndicate, c/o H. A. Anderson & Co., archts., 5 North La Salle St., general contract 6 story, basement, 100 x 173 ft., rein.-con., Orleans and Huron Sts., to Lanquist Constr. Co., 1100 North Clark St. Est. $500,000.

Ind., Evansville — BANK — Morris Plan Co., O. C. Carr, genl. mgr. 4th and Sycamore Sts., 13 story, basement, 75 x 115 ft., steel, rein.-con., to M. J. Hoffman Constr. Co., 402 Furniture Bldg. Est. $700,000. Noted May 23.

Ia., Sioux City—OFFICE—K. E. Westerlind, 116 War Eagle Bldg., 12 story, basement, L shaped, 63 x 150 ft., 4th and Jackson Sts., to B. F. Short Constr. Co., 420 Court St., for Fourth and Jackson Street Building Corp. Est. $800,000. Noted June 6.

La., New Orleans — MEDICAL — Favrot & Livaudais, archts., Hibernia Bank Bldg., 9 story, brick, steel, rein.-con., to G. J. Glover Co., Inc., Whitney Bank Bldg., for Tulane University. Est. $1,000,000. Noted May 23.

Mass., Boston—STORE—Kennedy Clothing Co., 32 Summer St., altering 5 story, basement, 80 x 120 ft., brick, plain found., Summer and Hawley Sts., to G. B. H. Macomber, 38 Chauncy St. Est. $150,000.

Mass., Northampton — WARD — Dickinson Cooley Hospital, 3 story, basement, brick, stone, maternity ward building, plain found., to M. I. O'Connor, 696 Bridge Rd. Est. $150,000. Noted May 16.

Mich., Flint—BANK and OFFICE—First Natl. Bank, 1st and South Saginaw Sts., 7 story, basement, 30 x 55 ft., rein.-con., brick, steel, plain found., West 1st St., to Sorenson & Gross Constr. Co., 515 Industrial Bldg. Est. $300,000.

Mich., Pontiac—HOSPITAL and NURSES HOME—Bd. Supervs. Oakland Co. 3 story, basement, 36 x 135 ft., rein.-con., brick, steel, plain found., to Chissus Bros., Birmingham; steam heating, to J. W. Phillips, Royal Oak. Est. $150,000. Noted Nov. 8.

Minn., Minneapolis — AUDITORIUM — State Commissioners Administration & Finance, State Capitol, St. Paul, general contract completing auditorium, to Paul Steenberg Constr. Co., 914 Builders Exch., St. Paul. $274,000.

Miss., Tupelo — STORE — C. M. Moore & W. A. Gregory, brick, concrete, to Leake & Goodlet, Tupelo. Est. $150,000. Montgomery, Ward & Co., Chicago Ave. and LaMarr St., lessee.

N. J., Elizabeth—STORE—Roessler Furniture Co., 85 Broad St., general contract 5 story, basement, 32 x 100 ft., brick, steel, plain found., to Kaplan & Frankel, 204 East 28th St., New York. $150,000. Noted June 13.

N. J., Totowa (mail Paterson)—HOSPITAL—Dpt. Institutions & Agencies, State Office Bldg., Trenton, general contract 2 story, basement, 55 x 140 ft., brick, steel, to C. Cona Building Co., 383 Haledon Ave., Paterson. Est. $150,000. Noted Apr. 11.

N. Y., Brooklyn—LOFT—East New York Terminal Buildings, Inc., 1662 Pitkin Ave., 6 story, basement, 100 x 200 ft., rein.-con., East New York and Junius St., to Turner Constr. Co., Graybar Bldg., New York.

N. Y., Marcy—HOSPITAL—Dpt. Mental Hygiene, Capitol, Albany, general contract hospital, at Marcy Div. Utica State Hospital, to W. F. Hendrich Co., 2777 East 53rd St., Cleveland, O., $283,000. Noted Mar. 28.

N. Y., Oneonta—BANK—Halsey, McCormick & Helmer, archts., 286 Madison Ave., New York, bank, to J. J. Turner & Sons, Amsterdam, for Wilbur Natl. Bank, Main St. Noted May 30.

Pa., Carnegie—EXCHANGE—Bell Telephone Co. of Pennsylvania, 7th Ave., Pittsburgh, 3 story, basement, to W. F. Trimble & Sons, 1719 Penna Ave. N.S., Pittsburgh. Est. $200,000.

Pa., Pittsburgh — EXCHANGE — Bell Telephone Co. of Pennsylvania, 416 7th St., general contract 23 story, basement, 60 x 120 ft., brick, hollow tile, steel addition, to W. F. Trimble & Sons, 1719 Penna. Ave. N.S. Est. $1,500,000.

Pa. Pittsburgh—HOSPITAL—Allegheny General Hospital, H. L. Mason in charge, Oliver Bldg., 15 story, brick, steel hospital, to J. L. Stewart & Co., 17 East 42nd St., New York. Noted May 16.

Wash., Seattle—COUNTY—City, Comrs. King Co., 6 story, basement addition to County-City Building, to H. Pederson, 1105 2nd Ave., $2,148,708. Noted May 16.

W. Va., Huntington — HOSPITAL — Chesapeake & Ohio R.R. Co., C. W. Johns, ch. engr., 825 East Main St., Richmond, Va., hospital addition to John W. Cowper Co., Inc., State Planters Bank Bldg., Richmond. $225,000.

Wis., Milwaukee—WAREHOUSE—Great Atlantic & Pacific Co., 421 Lexington Ave., New York, N. Y., or 450 East Ohio St., Chicago, Ill., 5 story, warehouse, to L. L. LeVeque, Edgehill Rd., Columbus, O. Est. $200,000.

Federal Government Work

Proposed Work

Calif., San Francisco—NURSES DORMITORY—U. S. Engineer Office, Nurses Dormitory Building, Addition C, and altering Nurses Dormitory 56.

Bids Asked

Arkansas—DIKES—July 5, by U. S. Engineer Office, McCall Bldg., Memphis, Tenn., 5,700 lin.ft. permeable pile dikes or permeable crib dikes in Mississippi River near Morgan Point.

Calif., Riverside—Quarters, etc.—July 22, by Constructing Quartermaster, Marsh Field, 25 sets non-commissioned officers quarters, also installing street lighting system, Marsh Field; adv. E. N.-R. June 27.

Florida—July 24, by State Road Dpt., R. W. Bentley, chn., Tallahassee, bridge over Hillsboro River, Rd. 4, F. A. Project 68-2, bridge over Pompano Canal, F. A. Project 68-3, and bridge over Tarpon River, F. A. Project 68-6, Broward Co.—bridge over Rice Creek, Rd. 3, Project 721-B, Putnam Co.—bridge over Withlacoochee River, Rd. 5, Project 835, Marion and Citrus Counties. J. L. Cresap, state hy. engr.

Illinois—REVETMENT—July 10, by U. S. Engineer Office, Custom House, St. Louis, Mo., 7,000 ft. bank revetment, Mississippi River, at Scudder Towhead; adv. E. N.-R. June 27. Noted June 20.

Ind., Richmond—REMODELING—July 2, by Treas. Dpt., at office Supervising Archt., Wash., D. C., supplemental bids from original bidders for remodeling Post Office. Noted Apr. 25.

Kan., Oak Mills—REVETMENT—July 17, by U. S. Engineer Office, Postal Telegraph Bldg., Kansas City, Mo., 20,350 lin.ft. standard revetment in Bean Lake Bend, Missouri River, 4.3 mi. from Oak Mills.

Missouri—DIKES—July 11, by U. S. Engineer Office, Postal Telegraph Bldg., Kansas City, 4,200 lin.ft. standard pile clump dikes at Contrary Bend, and 9,100 lin.ft. at Kenmoor Bend, in Missouri River south of St. Joseph. Noted June 13.

Nev., Fallon — APPROACH — July 16, by Treas. Dpt., at office Supervising Archt., Wash., D. C., approach work at Post Office.

N. Y., Brooklyn—BOILERS—Spec. 5923—July 3, by Bureau Yards & Docks, Navy Dpt., Wash., D. C., changing boilers from coal to oil burning, incl. furnace, setting oil storage, tank, tank pit, oil pumping, heating equipment. Noted June 20.

N. Y., Watertown—EXTENSION—July 22, by Treas. Dpt., at office Supervising Archt., Wash., D. C., extension and remodeling U. S. Post Office; adv. E. N.-R. June 27.

North Carolina—BRIDGE—July 25, by U. S. Engineer Office, Wilmington, N. C., highway bridge across intracoastal waterway from Beaufort to Cape Fear River; adv. E. N.-R. June 27. Noted June 20.

O., Cincinnati—EXTENSIONS—July 17, by Treas. Dpt., at office Supervising Archt., Wash., D. C., extending mezzanine, at Custom House and Post Office.

Tenn., Memphis—EARTHWORK—July 16, by U. S. Engineer Office, 3,345,000 cu.yd. earthwork in Upper Yazoo and White River Levee Dists.

Tex., Fort Sam Houston (sta. San Antonio)—ROOFING, etc.—Constructing Quartermaster, taking bids 820 rolls black, smooth surface prepared asphalt roofing; 4,400 lb. roofing asphalt in drums, 2,500 yd. gray Battleship linoleum; 6,000 ft. yellow pine lumber, 1,680 ft. yellow pine lumber.

Wash., Walla Walla—ROAD—July 23, by U. S. Veteran's Bureau, Arlington Bldg., Wash., D. C., constructing Roads, A, B, C, at U. S. Veteran's Hospital.

Porto Rico—HOSPITAL—Aug. 6, by Constructing Quartermaster, San Juan, or Constructing Quartermaster, 39 Whitehall St., New York, hospital building, 8 company officers quarters, 5 non-commissioned officers quarters and 1 infantry barracks at Henry Barracks; adv. E. N.-R. June 28. Noted May 2.

Bids Received

Ariz., Tucson — POST OFFICE and COURT HOUSE — Treas. Dpt., at office Supervising Archt., Wash., D. C., June 19, 4 story, basement post office and court house, from R. E. McKee, El Paso, Tex., $414,300. Noted May 23.

Ariz., Tucson — WELL — U. S. Veteran's Bureau, Arlington Bldg., Wash., D. C., June 11, drilling, developing, testing deep well, at U. S. Veteran's Hospital, from C. W. Pistor, 417 South 4th Ave., $2,186. Noted May 23.

Ark., Little Rock—ELEVATOR REPAIRS—Treas. Dpt., at office Supervising Archt., Wash., D. C., June 13, repairing elevator at U. S. Post Office, from Millner Co., 1706 North 12th St., St. Louis, Mo., $2,106. Noted May 30.

Conn., Branford—DREDGING—U. S. Engineer Office, Providence, R. I., June 14, in Branford River, from J. S. Packard Dredging Co., Turks Head Bldg., Providence, R. I., $7,526. Noted May 16.

D. C., Wash.—ENGINE GENERATOR SETS—Dpt. Commerce, Wash., D. C., engine generator sets from Modern Equipment Co., Muskegon, Mich., $656 each (30-60 days).

D. C., Wash.—CRUISERS—Navy Dpt., C. F. Adams, secy., May 28, constructing cruisers, from Bethlehem Shipbuilding Corp., Quincy, Mass., $10,753,000. Noted Apr. 4.

D. C., Wash. — HOSPITAL — Dpt. Interior, Wash., D. C., medical, surgical building, connecting corridors, St. Elizabeth Hospital, from Virginia Eng. Co., Newport News, $694,000; elevator equipment, from Marsh Elevator Co., Prestdent and Aliceanna Sts., $11,440. Noted May 9.

Ga., Athens—REMODELING—Treas. Dpt., at office Supervising Archt., Wash., D. C., June 21, remodeling and enlarging U. S. Post Office and Court House, from Palmer Co., Atlanta, $2,950. Noted May 30.

Ill., Oak Park—WORK ROOM—Treas. Dpt., at office Supervising Archt., Wash., D. C., June 18, extending work room at U. S. Post Office, from Desmond & Son, Oak Park, $3,600. Noted June 6.

Minn., Fergus Falls—CHANGES—Treas. Dpt., at office Supervising Archt., Wash., D. C., June 14, changes on 2nd floor, at U. S. Court House and Post Office, from J. Lauritzen, Fergus Falls, $1,695. Noted May 30.

Montana and Idaho—DRAINS—Bureau Reclamation, Dpt. Interior, Savage, Mont., May 10, earthwork, structures for open drains, from Ewing & Ralser, Billings, Mont., $81,204. Noted Apr. 18.

N. M., Fort Stanton—ENGINE and GENERATOR—Treas. Dpt., at office Supervising Archt., Wash., D. C., engine and generator at U. S. Marine Hospital, from National Telatrophone Co., El Paso, $18,024.

O., Bellaire—PIPING—Treas. Dpt., at office Supervising Archt., Wash., D. C., in U. S. Post Office, from J. L. Powers, Bennettsville, S. C., $1,625.

O., Chillicothe—DRAINAGE—U. S. Veteran's Bureau, Arlington Bldg., Wash., D. C., June 4, from W. E. McGee & Son, Chillicothe, Routes (2) $0.50 (3) $0.50 (5) $0.50 (6) 18 in. pipe at $1.77 per lin.ft. (7) $0.50 (9) $0.50 (60 days); from Brewer & Brewer Sons, Chillicothe, (4) $1.30 (6) 6 in. pipe $0.65. Noted May 23.

O., Columbus—ELEVATOR DOORS—Treas. Dpt., at office Supervising Archt., Wash., D. C., elevator entrance doors, for Post Office, from Highbridge International Co., 1526 Sedgewick Ave., New York, $8,994.

Ore., Vale — CANAL — Bureau Reclamation, Dpt. Interior, June 14, from W. H. Puckett Co., Boise, Idaho, constructing earthwork, tunnels and structures on Vale Main Canal Project, Schedule 1 $179,418, Schedule 2 $219,875, Schedule 3 $96,178. Noted May 9.

Pa., Coatesville—HOSPITAL—U. S. Veteran's Bureau, Arlington Bldg., Wash., D. C., June 21, general contract building at U. S. Veteran's Hospital, from A. C. Samford, 301 Washington St., Montgomery, Ala., $786,100; plumbing and heating, from S. Grunwald, 1110 Farnam St., Omaha, Neb., $116,000 and $76,000 respectively; electrical work, from Keystone Eng. Co., 335 Walnut St., Reading, $47,500; elevators, from Marsh Elevator Co., President and Aliceanna Sts., Baltimore, Md., $15,738; refrigerating equipment, from York Ice Mchy. Co., 2222 Arch St., Phila., $20,384; steel water tank and tower, from Pittsburgh-Des Moines Steel Co., 429 Pennsylvania Ave., Pittsburgh, $15,760; radial brick chimney, from M. W. Kellogg Co., 7 Dey St., New York, $7,777. Noted May 9.

Pa., Phila.—DREDGING—U. S. Engineer Office, June 7, 223,000 cu.yd. at intersection Bellevue and Cherry Island ranges, Delaware River, from Atlantic Gulf & Pacific 15 Park Row, New York, at $0.159 per cu.yd. Noted Apr. 25.

Tex., El Paso—ELEVATOR—Treas. Dpt., at office Supervising Archt., Wash., D. C., June 6, installing freight elevator, from Otis Elevator Co., 810 18th St. N. W., $3,865—mailing platform, elevator hoistway, from H. T. Ponsford Son, 914 East Missouri St., $7,970. Noted May 16.

Tex., Houston—DREDGING—U. S. Engineer Office, Galveston, May 6, in Houston Ship Channel between Galena Signal Oil Co. plant and Penn City Ferry, Sects. 1 and 2, from Orleans Dredging Co., 323 Guaranty Bldg., Galveston, at $0.2347 per cu.yd. Noted Apr. 11.

Virginia and North Carolina—DREDGING—U. S. Engineer Office, May 15, maintenance dredging 1,575,000 cu.yd. in Low North Landing River-Currituck South, from Calkins Dredging Co., Royster Bldg., Norfolk, Va., at $0.0723 per cu.yd.; 1,265,000 cu.yd., from Arundel Corp., Pier 2, Pratt St., Baltimore, Md., at $0.063 per cu.yd. Noted Apr. 18.

Va., Norfolk—BREAKWATER—Treas. Dpt., at office Supervising Archt., Wash., D. C., June 17, concrete breakwater at U. S. Marine Hospital, from Tunstall-Johnson, Inc., City Bank Bldg., $9,356; boat landing, from Haycox Concrete Corp., 432 West 21st St., $1,285. Noted May 30.

Va., Quantico — PAVING—Spec. 5904—Bureau Yards & Docks, Navy Dpt., Wash., D. C., paving at U. S. Marine Barracks, from E. P. Lindsay, Portsmouth, $23,177. Noted June 6.

Wash., American Lake—HOSPITAL—U. S. Veterans' Bureau, Arlington Bldg., Wash., D. C., June 14, building and utilities, at U. S. Veterans' Hospital, from L. Dioguardi, 30 West Poplar Ave., San Mateo, $167,783 (180 days). Noted May 16.

Contracts Awarded

Conn., Hartford—DREDGING—U. S. Engineer Office, Providence, R. I., in Connecticut River, below here, to Arundel Corp., Pratt St., Baltimore, Md., $29,628. Noted May 16.

Conn., New London—OFFICE BUILDING—Coast Guard, Derby Bldg., timber office building Base 4, to A. Jackson & Co., Bridge St. Noted June 13.

Constr. News page 387

Federal Government Work (Continued)

D. C., Wash. — LIBRARY — Congressional Library, general contract addition to Congressional Library, to Boyle-Robertson, 1420 New York Ave., $329,000. Noted Mar. 7.

Florida—DREDGING—U. S. Engineer Office, Jacksonville, 172,000 cu.yd. to Holloway & Du-Pont Dredging Co., Fort Lauderdale, $43,000.

Ill., Alton—REMODELING—Treas. Dpt., at office Supervising Archt., Wash., D. C., remodeling, enlarging Post Office, to E. E. Garber, Bethlehem, Pa., $21,250. Noted June 6.

Ill., Savanna—MAGAZINE BUILDINGS—Constructing Quartermaster, 24 magazine buildings, Savanna Ordnance Depot, to Cardiani & Co., Herrin, $79,840. Noted June 13.

Ill., Waukegan—WALL—Spec. 5927—Bureau Yards & Docks, Navy Dpt., Wash., D. C., repairing parapet wall at Naval Training Station, to T. Jensen, 625 North Ave., $5,487 (120 days).

Minn., Crookston—BOILER—Treas. Dpt., at office Supervising Archt., Wash., D. C., boiler at U. S. Post Office, to Northern Hardware & Plumbing Co., Crookston, $2,235. Noted June 13.

N. J., Picatinny Arsenal (mail Dover)—BUILDINGS—Constructing Quartermaster, 12 buildings in bag loading area, to Newman & Birtwell, Asbury Park. Est. $150,000. Noted May 16.

N. J., Somerset (mail Titusville)—HOSPITAL—U. S. Veteran's Bureau, Arlington Bldg., Wash., D. C., ice making and refrigeration plant, for U. S. Veteran's Hospital, to Pyles Refrigerating & Eng. Co., Baltimore, Md., $21,000; steel water tank, to Chicago Bridge & Iron Co., Jefferson Bldg., Phila., Pa., $6,780; radial brick chimney, to H. R. Reinicke, 342 Madison Ave., New York, $8,442; electrical work, to R. P. Phelps, Beloit, Wis., $64,000; elevators, to Otis Elevator Co., 810 18th St. N. W., $23,000. Grand total $123,222. Noted June 20.

N. Y., Brooklyn—CABLE—Signal Supply Officer, Signal Sect. New York General Depot, 58th St. and 1st Ave., telephone cable, to Graybar Electric Co., 401 Hudson St., New York, at $0.01166 for domestic and $0.01223 for export. Noted Apr. 11.

N. Y., Castle Point—WING—U. S. Veteran's Bureau, Arlington Bldg., Wash., D. C., altering wing B, to L. H. Swenson, 39 Market St., Poughkeepsie, $3,300.

N. Y., Syracuse—CHANGES—Treas. Dpt., at office Supervising Archt., Wash., D. C., enlarging ash pit, installing lift, to E. P. Bates Co., 213 South West St., $4,595. Noted June 20.

O., Fairfield—POST OFFICE—Treas. Dpt., at office Supervising Archt., Wash., D. C., post office, to McGough Bros., 1945 Jefferson Ave., St. Paul, Minn., $93,825 (420 days).

Oregon—ROADS—Bureau P. Rds., Portland, grading, paving 2,500 ft. road, Burns Co., to E. Metzger, Roseberry, $90,899; 13.76 mi. Mt. Hood Natl. Forest Hy., Wasco Co., to R. E. Harness, Burns, $84,415.

Pa., Oil City—REMODELING—Treas. Dpt., at office Supervising Archt., Wash., D. C., U. S. Post Office, to E. E. Garber, Bethlehem, $19,290. Noted May 23.

Pa., Pittsburgh—POWER PLANT MACHINERY—U. S. Engineer Office, power plant machinery, to J. and J. Millholland Co., 714 5th Ave., $12,139. Noted Apr. 25.

Pa., Pittsburgh—LOCK BUILDINGS—U. S. Engineer Office, at Deadman Island Locks, Ohio River, to Van Arlen Constr. Co., Stock Exch. Bldg., Phila., $34,000. Noted Apr. 25.

Pa., Pittsburgh—GATES—U. S. Engineer Office, one upper and one lower lock gates for Lock 7, Allegheny River, to Treadwell Constr. Co., Midland, Fla., $17,098. Noted Apr. 18.

Tenn., Memphis—EARTHWORK—U. S. Engineer Office, 2,130,000 cu.yd. earthwork on St. John's Bayou Levee and Lower St. Francis Levee Dist., Piece 5, to W. W. Roth, Hickman, Ky.; Piece 9, work to be done by government hire. Noted Apr. 25.

Tenn., Memphis—TENDER—U. S. Engineer Office, 40 ft. steel dredge tender, to Ayer & Lord Tie Co., 80 East Jackson Blvd., Chicago, Ill., $13,815. Noted Apr. 25.

Va., Fort Myer—RADIO BUILDING—Constructing Quartermaster, Tempo Bldg. No. 5, 1st and B Sts. N. W., radio building, to Bahen & Wright, 1223 New York Ave. N.W., Wash., D. C. $27,349. Noted May 23.

Unclassified

Proposed Work

SUBWAY—Sacramento, Calif.—City, Sacramento Co., and Southern Pacific R.R. Co., 65 Market St., San Francisco, G. W. Boeschke, ch. engr., subway under Southern Pacific at H St. $100,000 or more. B. C. Clark, city engr.

TRAIN SHED—Boston, Mass.—New York, New Haven & Hartford R.R., E. Gagel, ch. engr., New Haven, Conn., new train shed at South Station. $25,000 or more.

BREAKWATER—Mattapoisett, Mass.—Town, W. E. Brown, chn. com., breakwater, Mattapoisett Harbor, boulders, rip rap, $25,000.

PARK IMPROVEMENT—Englewood, N. J.—Bd. City Council, Municipal Bldg., improving 27 acres Lexon Tract, incl. grading, roadways, Knickerbocker Rd., and converting into park, $265,000. W. Smullen, West Palisade Ave., city engr.

TRAFFIC LIGHTS—Paterson, N. J.—Bd. P. Wks., City Hall, soon takes bids on revised plans traffic lighting system, and equipment, $100,000. H. J. Harder, city engr. H. Kelly, 1660 Broad St., Newark, consult. engr. Noted May 9.

ADMINISTRATION and CEMETERY—Twinsburg, O.—Syndicate, c/o C. W. Beck, 653 Terminal Tower, brick, steel administration building and cemetery, Brown Hill, $500,000.

STORAGE TANK—Toronto, Ont.—Sun Oil Co. Ltd., 25 Atlantic Ave., soon takes bids 25,000 bbl. oil storage tank, steel. $30,000. W. A. Courtney, 25 Atlantic Ave., engr.

MARINE TOWERS — Sorel, Que. — North American Elevators Ltd., R. A. Campbell, secy., soon takes bids two 24 x 34 ft. steel traveling marine towers, 163 ft. 10 in. high.

Bids Asked

SWIMMING POOL, etc. — **Palos Verdes Estates, Calif.**—K. Cutter, archt., Farmers & Merchants Bank Bldg., Long Beach, taking bids, 45 x 105 ft. swimming pool and wading pool, 3 story, basement bath house, for Palos Verdes Estates. Noted May 23.

STEEL TOWER — Springfield, Mass. — Mt. Tom State Res. Com., Court House, taking bids 30 ft. high, steel observation tower with concrete found. and stairs.

FIELD HOUSE, RUNNING TRACK, etc.—**Columbia, Mo.**—July 1, by Bd. Curators University of Missouri, C. L. Brewer, athletic dir., 2 story, 160 x 250 ft., rein.-con., stone field house, incl. dirt athletic track, basketball courts. $225,000. Jamieson & Spearl, Arcade Bldg., St. Louis, archts. Noted May 30.

BOILERS, STOKERS, etc.—**Lincoln, Neb.**—July 1, by State University, three 800 hp. boilers, 2 stokers, two 1,500 kw. turbines and condensers, coal handling equipment, cooling tower, switchboard in heating and power plant, Burns & McDonnell Eng. Co., 401 Interstate Bldg., Kansas City, Mo., engrs.

LAND DEVELOPMENT — Woodbridge (br. Rutherford), **N. J.**—See "Contracts Awarded."

SUBWAY—Phila., Pa.—July 19, by Dpt. City Transit, C. E. Meyers, dir., City Hall Annex, 4,565 lin.ft. 2-track subway and appurtenant work in Ridge Ave. between 8th and Broad Sts., Contr. 301. $500,000.

STEEL TUGS—Ottawa, Ont.—July 23, by S. E. O'Brien, secy. Dpt. P. Wks., constructing 2 single screw sea going steel tugs.

GREENHOUSE—Ste. Anne, Que.—July 2, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., superstructure new greenhouse for Ste. Anne's Hospital.

Contracts Awarded

GRAVEL PIT and PLANT—Camden, Ark.—Standard Gravel Co., J. W. Sander, pres., 1038 Sheridan St., Shreveport, La., gravel pit, plant, near here, and 1.5 mi. spur to Missouri Pacific R.R., day labor. $70,000. Private plans.

GRAND STAND — Atlanta, Ga. — Georgia School of Technology, c/o A. H. Armstrong, 51 x 281 ft., rein.-con. grandstand, day labor; structural steel, to F. E. Golian Co., 101 Marietta Bldg.

STADIUM—Kansas City, Kan.—Bd. Educ., c/o Secretary, general contract 60 x 700 ft. rein.-con. stadium, 5,000 seating capacity, incl. dressing rooms, showers, indoor track, to Wyatt & Barcus, 1611 Nebraska St., $39,920.

STADIUM—Brighton (sta., Boston), **Mass.**—Harvard Athletic Assn., 399 Harvard St., Cambridge, steel bleacher addition to stadium, 18,000 seating capacity, to Stone & Webster, 49 Federal St., Boston. $140,000.

TURBINE—Moorhead, Minn.—R. G. Price, city clk., steam turbine in water and light plant, to Westinghouse Electric & Mfg. Co., 2303 N. E. Kennedy St., Minneapolis. Est. $50,000. Noted June 6.

BARGE TERMINAL — Stillwater, Minn. — C. A. Lammers, city clk., barge terminal, incl. 972 ft. pile, timber trestle on St. Croix River, to Lyman Sutton, Stillwater, $25,522. Total est. $50,000. Noted June 6.

GRAIN ELEVATOR—Omaha, Neb.—Chicago, Burlington & Quincy R.R. Co., 10th and Farnam Sts., 46 x 228 ft., grain elevator, 90 ft. high, rein.-con., 1st and Grover Sts., to Burrell Eng. & Constr. Co., 1st and Grover Sts. Est. $150,000.

LAND DEVELOPMENT — Woodbridge (br. Rutherford), **N. J.**—C. H. Reis, Inc., Hackensack St., and development, incl. three hundred 2 story, basement residences, community house, streets, separate contracts. $1,500,000. P. J. Jossier, 240 Broad Ave., Palisades Park, archt. Noted June 20.

COAL STORAGE FACILITIES—Brooklyn, N. Y.—A. J. and J. J. McCollum, Inc., Water and Oakland Sts., 2 story, 41 x 133 ft., brick, steel, to Nicholson Co., 247 Park Ave., New York. Est. $65,000. Noted May 16.

HYDRO-ELECTRIC DEVELOPMENT — Kerrville, Tex.—Moody-Seagraves, Interests, Esperson Bldg., Houston, and Galveston, hydro-electric development, irrigation constructing series of curtain wall concrete dams, for propagating and preserving game fish, to M. P. Wright, Kerrville, $75,000; vertical turbo-generators, l.c. panels motors, pumps, for irrigation and domestic supply, to Peden Iron & Steel Co., 1401 South Flores St., San Antonio.

TUNNEL — Seattle, Wash. — Bd. P. Wks., 2,000 ft. concrete lined tunnel between Diablo Dam and power house of Skagit Hydro-Electric Project, to Rumsey & Jordan, Lumber Exch. Bldg., $544,894. Est. $1,000,000.

Materials

Bids Asked

FIRE HYDRANTS, etc.—**Chicago, Ill.**—July 3, by City, City Hall, 500 Chicago standard fire hydrants and quantity repair parts at City Pipe Yards. R. W. Wolfe, comr. P. Wks.

GENERATING EQUIPMENT—Decatur, Ill.—Taking bids carbon dioxide generating equipment in brick and stucco building appurtenances, Pearse, Greeley & Hansen, 6 North Michigan Ave., Chicago, engrs.; adv. E. N.-R. June 27.

BOILER, etc.—**Springfield, Ill.**—July 7, by City Council, at office E. Smith, mayor, furnishing and installing boiler with underfed or chain grate stoker, economizer, air preheater superheater and water walls at power plant, $75,000. W. Seeley, City Hall, engr.

BITUMINOUS MATERIAL—Greensburg, Ind.—July 1, by City Council, 15,000 gal. bituminous material. $5,000. R. H. Beeson, city clk.

PIPE—Vincennes, Ind.—July 2, by Comrs. Knox Co., concrete sewer pipe. G. M. Donaldson, Vincennes, engr.

STEEL—Shreveport, La.—July 1, by Caddo Police Jury, reinforcing steel 30,000 lb. ⅝ in. x 40 ft., 30,000 lb. ¾ in. x 40 ft., 10,000 lb. ⅞ in. x 40 ft. round bars and 10,000 lb. ¾ in. x 40 ft. square bars. J. T. Bullen, engr.

DIESEL ENGINES—Chisholm, Minn.—July 8, by City Water & Light Bd., c/o W. Jacobson, furnish and install 2 diesel engines. $80,000.

CULVERT PIPE—Lucedale, Miss.—July 1, by Bd. Comrs., furnishing metal, vitr. clay and concrete culvert pipe in car load lots.

ENGINE, etc.—**Oxford, Miss.**—July 11, by W. C. Trotter, secy. State Building Commission, 25 hp. Diesel engine, 22½ v.k. volt regulator, 22½ kva. transformer, 10 electric meters, equipment for dormitories for University of Mississippi.

CEMENT—New York, N. Y.—July 2, by J. Miller, pres. Manhattan Boro, Municipal Bldg., 25,000 bags portland cement.

BROKEN STONE—St. George, N. Y.—July 3, by J. A. Lynch, pres. Richmond Boro, Boro Hall, 1,000 cu.yd. ¾ in. broken stone, and 1,000 cu.yd. broken stone screenings 8-8 in Dists. 1, 2 and 3.

STEEL, STEEL TUBES, etc.—**Phila., Pa.**—July 5, by C. E. Walsh, purch. agt. Pennsylvania R.R. Co., 15 North 32nd St., structural steel, Contr. 30—1929; steel sheets, Contr. 31—1929; steel tubes, Contr. 32—1929; steel pipes, Contr. 33—1929; track fasteners, Contr. 34—1929.

CRUSHED ROCK and GRAVEL — Oroville, Calif.—July 8, by C. F. Belding, clk. Butte Co., 30,000 tons crushed rock and gravel.

Bids Received

WATER PIPE—Kansas City, Mo.—For 1,500 tons c.i. water pipe, 6- to 12-ft. lengths, from Lynchburg Fdry. Co., Lynchburg, Va., $68,475.

ASPHALTIC CEMENT — Brooklyn, N. Y. — J. J. Byrne, pres. Brooklyn Boro, Boro Hall, June 19, 250,000 gal. asphaltic cement, from Standard Oil Co. of New York, 26 Bway., New York, $11,500; 15,000 cu.yd. asphalt sand, from Ames Building Material Co., 3437 Kingsbridge Ave., New York, $14,250; 2,000 tons inorganic dust, from New York Trap Rock Co., 250 Park Ave., New York, $12,360; 3,000 cu.yd. sand, from M. F. Hickey Co., foot 6th St., $3,900; 5,000 bbl. cement, from S. B. Duffy, $12,150; 5,000 cu.yd. steam cinders, from Empire Cinders Co., 341 Madison Ave., New York, $9,738. Noted June 13.

ASPHALT CEMENT—New York, N. Y.—J. Miller, pres. Manhattan Boro, Municipal Bldg., June 18, 700,000 gal. asphalt cement from New York Trap Rock Co., 250 Park Ave., $23,080; 4,000 net tons inorganic dust, from Warner Quinlan Co., 2 Park Ave., $32,480. Noted June 13.

Contracts Awarded

LEAD CABLE—Boston, Mass.—Supply Dpt., furnishing lead covered cable, to Okonite Co., Statler Bldg., $9,000.

WATER PIPE—Kansas City, Mo.—For 1,500 tons c.i. water pipe, 16 ft. lengths, to Lynchburg Fdry. Co., Lynchburg, Va., $69,675.

SPECIAL WORK — New York, N. Y. — Bd. Transportation, J. H. Delaney, chn., 49 Lafayette St., special work, to William Wharton, Jr. & Co., 110 East 42nd St., $26,865; protection board, to Buffalo Brake Beam Co., 32 Nassau St., $11,914; rail insulators, to Ohio Brass Co., 50 Church St., $13,020; cups and caps to Troy Malleable Iron Co., Troy, $6,353; rail appurtenances, to W. G. Creamer & Co., 572 Smith St., Brooklyn, $13,644. Grand total $71,796. Noted June 6.

Foreign

Chile — Lautaro Nitrate Co. Ltd., Valparaiso, design and construction nitrate recovery and concentration plant, to Guggenheim Bros., 120 Bway., New York, $32,000,000. Maturity in fall.

Constr. News page 388

See proposal advertising on page 110

UNIT PRICES

Road—Pennsylvania

State Highway Department, Harrisburg, opened bids Apr. 12, road in Muncy Creek Twp., Lycoming Co., Route No. 303, 11,786 ft. long, 18 and 28-ft. wide, one-course reinf. conc. Lowest three and highest bidders are: (A) Standard Constr. Co., Altoona (awarded contract); (B) J. M. Hutchison, Altoona; (C) Rauch & Kessler, Northumberland; (D) Colonial Construction Co., Pittsburgh.

	A	B	C	D
11,027 cu.yd. Class 1 excav. without class	$0.70	$0.75	$0.90	$1.20
1,178 cu.yd. Class 2 excav. without class	1.00	1.50	2.00	2.00
Clearing and grubbing	300.00	400.00	250.00	2,000.00
21,173 sq.yd. subgrade	.12	.15	.20	.15
10,487 lin.ft. shoulders	.15	.20	.10	.20
20 sq.yd. one course plain cement conc. pave. 6 and 6 in.	2.90	2.75	2.50	3.30
21,153 sq.yd. one course reinf. cement conc. pave., full width, 9 and 7 in.	2.88	2.80	2.80	3.30
34 cu.yd. Class "A" conc.	24.00	25.00	30.00	30.00
201 cu.yd. Class "B" conc.	21.00	20.00	21.00	23.00
10,804 lb. plain steel bars	.06	.08	.06	.06
272 lin.ft. 14-in. c. i. pipe	3.30	4.00	2.00	3.00
268 lin.ft. 15-in. reinf. conc. pipe	2.20	3.00	2.00	2.50
40 lin.ft. 18-in. reinf. conc. pipe	3.06	3.50	3.00	3.00
114 lin.ft. 15-in. corrugated metal pipe, relaid	.94	1.00	1.00	2.00
160 lin.ft. stone underdrain	.60	.80	.90	.80
875 lin.ft. 4-in. tile underdrain	.85	.80	.90	1.00
50 lin.ft. 4-in. tile outlets	.65	.80	.80	1.00
29 cu.yd. Class "B" conc. for stream bed paving	18.50	20.00	18.00	20.00
Totals	$83,100	$84,090	$85,789	$102,491

Engineering News-Record, Issue of June 27, 1929.

Bridge—Kentucky

State Highway Department, Frankfort, opened bids Apr. 19, bridge over Clark's River on Benton-Paducah Rd., Federal Aid Project 193-AB, Marshall Co. Substructure consists of seventeen 30-ft. concrete deck girders spans, reinforced-concrete and pile bent piers, earth approaches; superstructure one 100 ft. steel span with concrete floor. Bidders on substructure are: (A) Cole & Moore, Paducah, (awarded contract); (B) Montgomery & Parker, Rockport, Ind. (C) N. E. Stone & Co., Madisonville; superstructure, (A) Vincennes Bridge Co., Vincennes, Ind., (awarded contract); (B) Montgomery & Parker; (C) Carter, Carter & Braden, Clay. J. S. Watkins, highway engineer.

Substructure	A	B	C
169.8 cu.yd. conc.—class "A"	$19.75	$20.00	$18.00
48.85 cu.yd. conc.—class "D"	35.00	50.00	40.00
987.5 cu.yd. conc.—class "F"	20.00	20.00	18.00
261,160 lb. reinforcing steel	.045	.045	.055
4,000 lin.ft. precast conc. piling	4.40	4.00	4.75
1,600 lin.ft. untreated timber piling	.80	.60	1.00
330 cu.yd. excav.—dry common	1.50	3.70	1.50
170 cu.yd. excav.—wet common	4.00	3.70	5.00
4,500 cu.yd. excav.—channel change	.15	.50	.37
2,080 cu.yd. excav.—common borrow	.35	.30	.35
Totals (not including time charge)	$58,024	$59,025	$61,487
Superstructure			
108,150 lb. structural steel	$0.061	$0.0625	$0.075
54.2 cu.yd. conc.—class "F"	21.60	20.00	20.00
10,600 lb. reinforcing steel	.05	.045	.05
Totals (not including time change)	$8,298	$8,320	$9,725

Engineering News-Record, Issue of June 27, 1929.

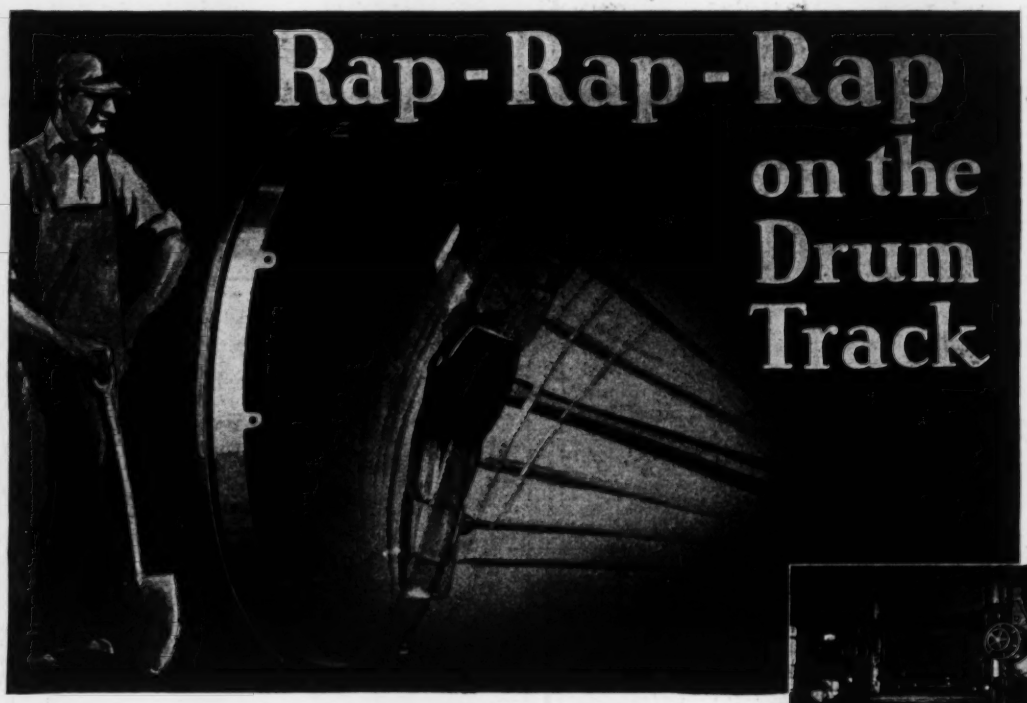
River Tunnel—Detroit, Mich.

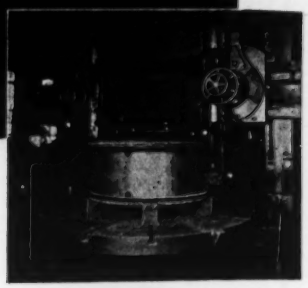
Board of Water Commissioners opened bids May 8, river tunnel for new water-works intake, Contract RC-3. Will be 3,576 ft. long, internal diameter 15 ft. 6 in., constructed in rock 180 ft. below surface of Detroit River, and lined with concrete. Includes sinking shore shaft to grade from its present depth of 152 ft. a distance of 50 ft. Bidders are: (A) R. S. Morrow & Son, 4353 Dodge St., Omaha, Neb., (awarded contract); (B) Dravo Contracting Co., Pittsburgh; (C) Frazier-Davis Contracting Co., St. Louis; (D) Mark R. Hanna Co., Detroit; (E) Mason & Hanger, New York; (F) S. A. Healy, Detroit; (G) George R. Cooke Co., Detroit; (H) States Contracting Co., Chicago; (I) Average Unit Price. George H. Fenkell, general manager and chief engineer.

	A	B	C	D	E	F	G	H	Average Unit Price I
580 cu.yd. shaft excavation—rock	$18.00	$20.00	$20.00	$25.00	$40.00	$20.00	$13.50	$45.00	$25.40
20,000 cu.yd. tunnel excavation—rock	6.43	10.50	10.00	12.00	11.75	12.50	12.80	11.00	10.87
20,000 cu.yd. tunnel excavation—rock	6.73	10.60	10.00	12.50	11.50	13.00	13.25	11.00	11.07
250 cu.yd. enlargement of shaft and tunnel	8.00	10.00	9.00	20.00	10.00	20.00	13.25	40.00	16.28
13,500 cu.yd. concrete lining	16.35	17.50	21.00	16.00	18.00	15.00	18.50	26.00	18.54
115,000 lb. permanent timbering	.06	.07	.10	.10	.05	.07	.06	.08	.0738
20 M. ft. b.m. temporary timbering	50.00	120.00	140.00	100.00	150.00	65.00	200.00	50.00	109.375
200 cu.yd. dry packing	5.00	6.00	9.00	6.00	10.00	5.00	4.00	5.00	6.25
Shaft and tunnel drainage (lump sum)	19,750.00	15,000.00	16,000.00	5,000.00	15,000.00	40,000.00	17,400.00	50,000.00	22,268.75
130,000 M. gal. power for pumping	.03	.03	.03	.03	.03	.03	.03	.03	.03
Ventilating plant (lump sum)	21,000.00	12,500.00	20,000.00	15,000.00	20,000.00	13,135.00	16,803.00	20,000.00	17,304.75
1 additional compressor	5,000.00	6,500.00	2,000.00	6,000.00	6,500.00	6,500.00	6,090.00	8,000.00	5,823.75
3,800 lin.ft. ventilating pipe	3.75	3.50	5.00	3.90	5.00	4.00	3.00	4.75	4.1125
1,000,000 kw. electric current	.0225	.0225	.0225	.0225	.0225	.0225	.0225	.0225	.0225
60,000 lb. reinforcing steel	.05	.05	.06	.06	.05	.07	.07	.06	.05875
16,000 lin.ft. drilling pilot holes	.65	1.25	.40	.50	.50	.50	1.25	1.00	.75625
2,200 lin.ft. drilling holes in rock	.80	.60	.40	.60	.50	2.00	2.00	1.00	.9875
2,000 linft. steel grout pipe	.50	1.00	.30	1.25	.50	1.00	.40	1.00	.74375
500 cu.yd. sand for grout	6.00	3.50	4.00	3.00	4.00	3.00	4.00	3.75	3.91
400 connections for grouting	.80	2.50	2.00	3.00	5.00	1.00	.50	5.00	2.475
650 cu.yd. mixing and placing grout	6.00	25.00	7.00	15.00	20.00	11.00	10.00	8.00	12.75
2,600 bbl. portland cement	2.75	2.60	3.00	2.50	3.00	2.50	3.00	3.25	2.825
75 ton hydrated lime	23.00	15.00	20.00	15.00	20.00	20.00	20.00	22.00	19.375
48 cores	70.00	70.00	30.00	100.00	25.00	50.00	80.00	75.00	62.50
Brick facing (lump sum)	2,100.00	2,500.00	2,000.00	2,500.00	2,000.00	2,000.00	3,500.00	3,000.00	2,450.00
2,400 lb. miscellaneous iron and steel	.17	.08	.10	.20	.20	.20	.20	.15	.1625
5,500 lb. brass, bronze, and copper	.45	.50	.70	1.00	.80	1.00	1.25	.60	.7875
Maintaining field offices (lump sum)	6,000.00	7,000.00	5,000.00	6,000.00	2,000.00	3,000.00	5,000.00	3,000.00	4,625.00
Cleaning up (lump sum)	1,000.00	10,000.00	2,000.00	5,000.00	500.00	5,000.00	17,500.00	3,000.00	3,125.00
Totals	$639,263	$836,707	$839,510	$867,195	$881,330	$894,715	$946,280	$1,019,985	

Engineering News-Record, Issue of June 27, 1929.

Construction News, Page 389





Turning Knickerbocker drum tracks to true circles in perfect alignment, on a vertical mill in the Knickerbocker shops.

OVER 170 blows a minute—half a ton of concrete tumbling inside the drum.

That's what takes place when a 7-S Knickerbocker concrete mixer is running.

Half a ton of concrete slithering off mixing blades into lifting buckets to be dumped onto the deflecting discharge chute and hitting the lower arc of the drum —nine buckets dumping their loads 19 times a minute.

It takes that kind of action to mix concrete thoroughly.

And that kind of action sure pounds the drum.

That's why a Knickerbocker drum has cast semi-steel drum tracks rivetted to the shell. In our shops, when the drum has its tracks in place, it is put on a vertical mill and at one setting those tracks are turned to true circles, in perfect alignment. When placed on the trunnions the drum *must* rotate evenly—never a flat wheel! The continual impact of the load is carried easily, surely, by the heavy track, which is easily replaceable in the field if that is ever necessary.

The drum tracks, not the trunnion rollers, are flanged. This distributes flange wear so it is negligible.

We have a booklet ready to send you that will describe the many other features built into Knickerbocker mixers to insure longer and better service. Ask for a copy.

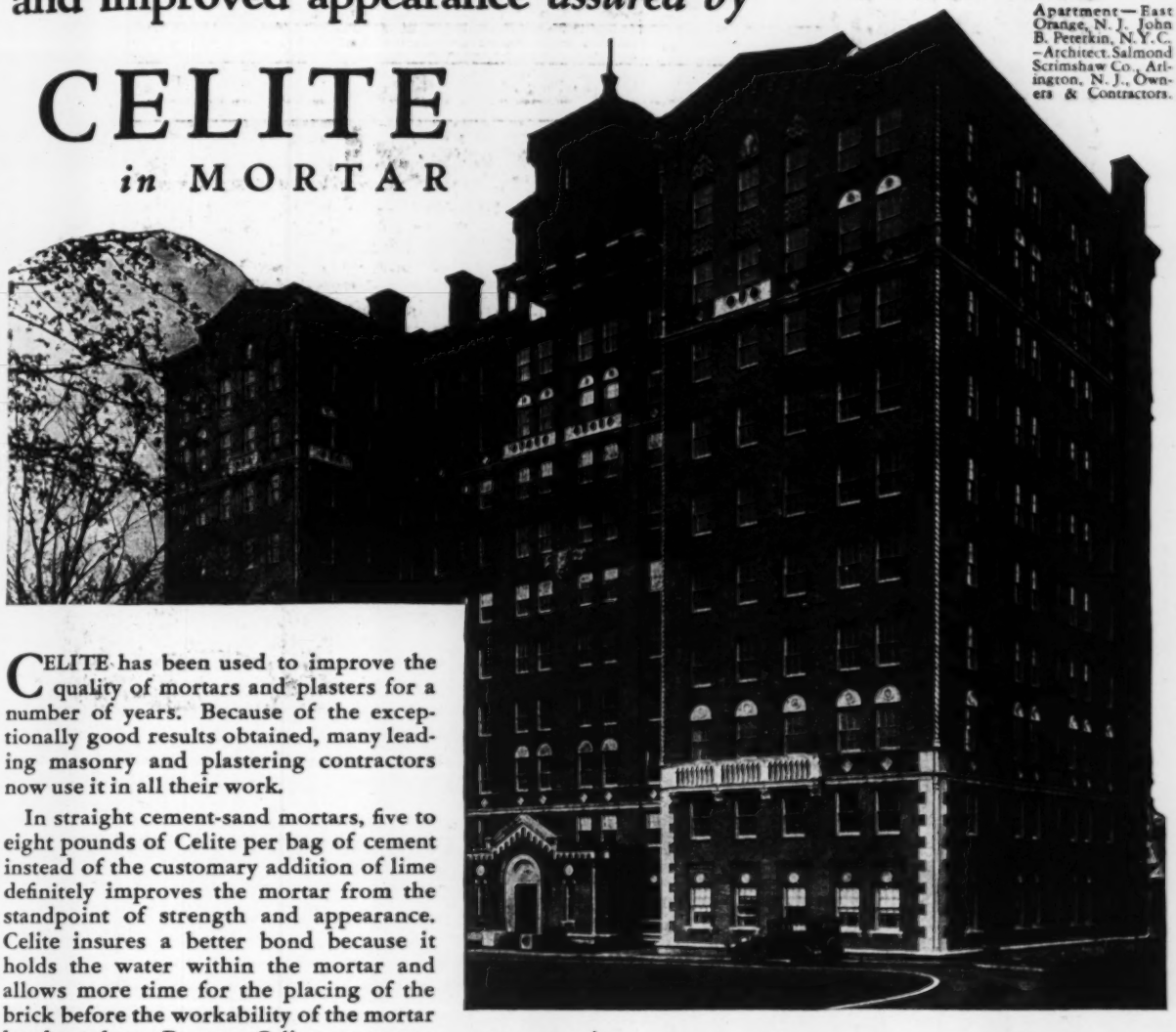
THE KNICKERBOCKER COMPANY, JACKSON, MICH.

KNICKERBOCKER
CONCRETE MIXERS

910

Increased workability . . greater strength . . better bonding and improved appearance *assured by*

CELITE *in* MORTAR



Apartment—East Orange, N. J. John B. Peterkin, N. Y. C. —Architect. Salmond Scrimshaw Co., Arlington, N. J., Owners & Contractors.

CELITE has been used to improve the quality of mortars and plasters for a number of years. Because of the exceptionally good results obtained, many leading masonry and plastering contractors now use it in all their work.

In straight cement-sand mortars, five to eight pounds of Celite per bag of cement instead of the customary addition of lime definitely improves the mortar from the standpoint of strength and appearance. Celite insures a better bond because it holds the water within the mortar and allows more time for the placing of the brick before the workability of the mortar has been lost. Because Celite overcomes the characteristic "shortness" of such mortars they will work easier and stretch further, and brick can be laid with thinner joints if desired.

Lime mortars, also, are strengthened by the addition of 10% to 15% of Celite by weight of lime as, within certain limits, Celite will combine with lime to give high early strength and to form harder mortar. Celite also increases the stretching quality of these mortars.

CELITE *practically eliminates efflorescence*

IN cement-sand mortar, the lime set free from the cement during hydration is often carried out of the mortar by capillary action and deposited on the face of the brick work. When these lime salt solutions evaporate, disfiguring efflorescence appears. Celite practically eliminates this difficulty —first, by replacing the lime which is customarily added to the mix, and secondly, by forming an insoluble compound with the lime set free from the cement during hydration and, in addition, the fat mortar secured by the use of Celite produces a water-tight mortar joint.

Johns-Manville
CELITE-for-CONCRETE

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Please send me a copy of your booklet "Celite for Concrete."

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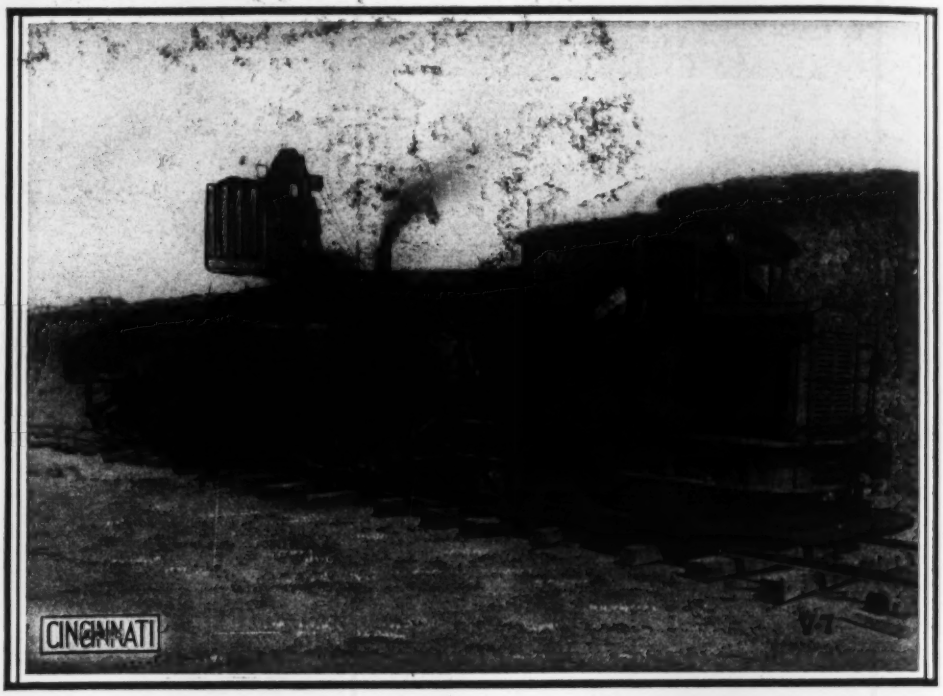

And Wheeling the Stuff Away

The shovel runner wants action—wants the cars spotted where he wants them "and that doesn't mean maybe." He knows the boss is looking to him to get the stuff moved.

Each time the Locomotive gets back to the shovel, it means numerous starts and stops—easy move-ups to spot the cars "right there."

That's one way the CINCINNATI shines. With lots of engine power and a nice smooth, easy acting clutch, the cars are eased up just as wanted and the shovel runner makes hay.

No clutch-grabbing with consequent bumping of cars past the spot—but that means lots of clutch slipping and that is the real test of a locomotive clutch.

In the CINCINNATI clutch slipping doesn't mean terrific heating and rapid wear of the facings because CINCINNATI design guards against that.

You do not have to renew the facings every little bit, at the expense of laying up the locomotive for a whole day to do the job.

That is the kind of design thru-out that makes CINCINNATI Locomotives so cheap to operate and maintain. Let us tell you more about them.

LOCOMOTIVE DIVISION
THE CINCINNATI CAR CORPORATION
Winton Place, Cincinnati, Ohio, U. S. A.

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helped turn a loss into a profit

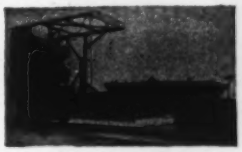
Buyers of any piece of equipment cannot know the value of this equipment until they have had time to put it into operation.

The true value of Heltzel Forms or other equipment is not in what it is but what it will do for you.

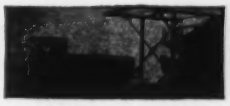
One contractor was due to take a large loss on a job until he put in Heltzel Forms. These modern forms turned an anticipated loss into a profit on this job. They will do as much for you. Get the facts.

The HELTZEL Steel Form & Iron Co.
Warren, Ohio

Heltzel Weighing Plant with springless scale and large dial.



Shipping Heltzel Trailer Bin



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Lifting Heltzel Trailer Bin into position

Send us proof of the profit making properties of Heltzel Road Forms

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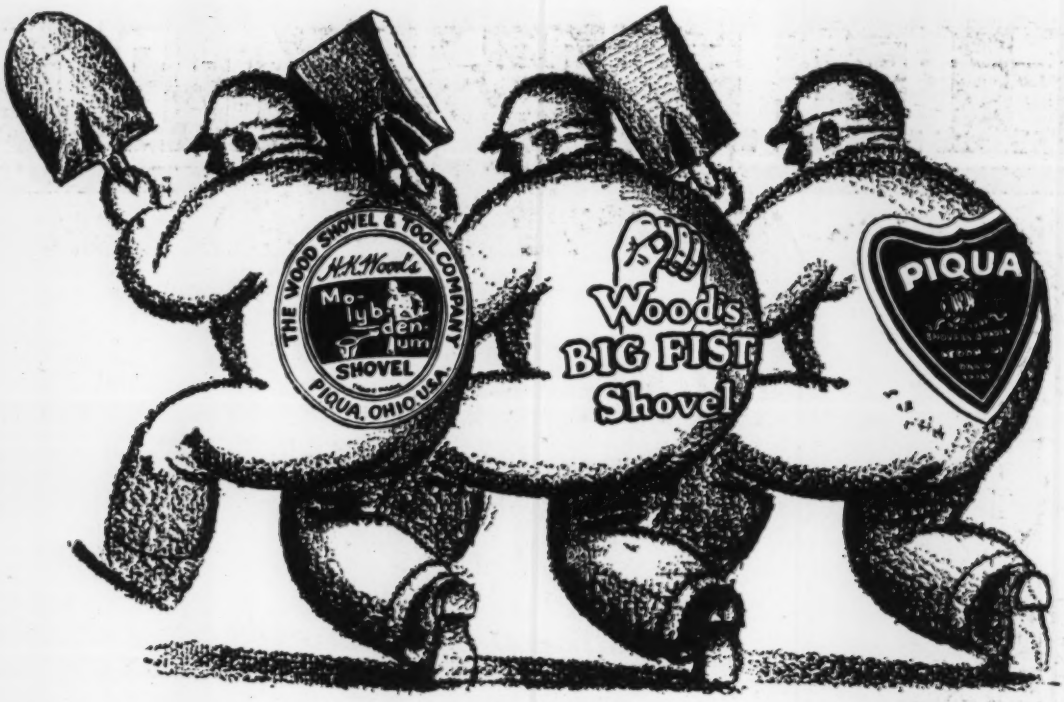

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HERE'S a tough and ready trio . . . . equal to any and all jobs. "Moly" (H. K. Wood's Mo-*lyb*-den-um Steel Shovel) easily stands up under the hardest usage and abuse. "Moly" is the old, rugged champion . . . . often challenged but never outshoveled.

Second only to the famous "Moly" is "Big Fist", the new specially heat-treated shovel. "Big Fist" rules the medium price class by right of its superior grit and strength.

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A shovel for every user—Distributed in every city

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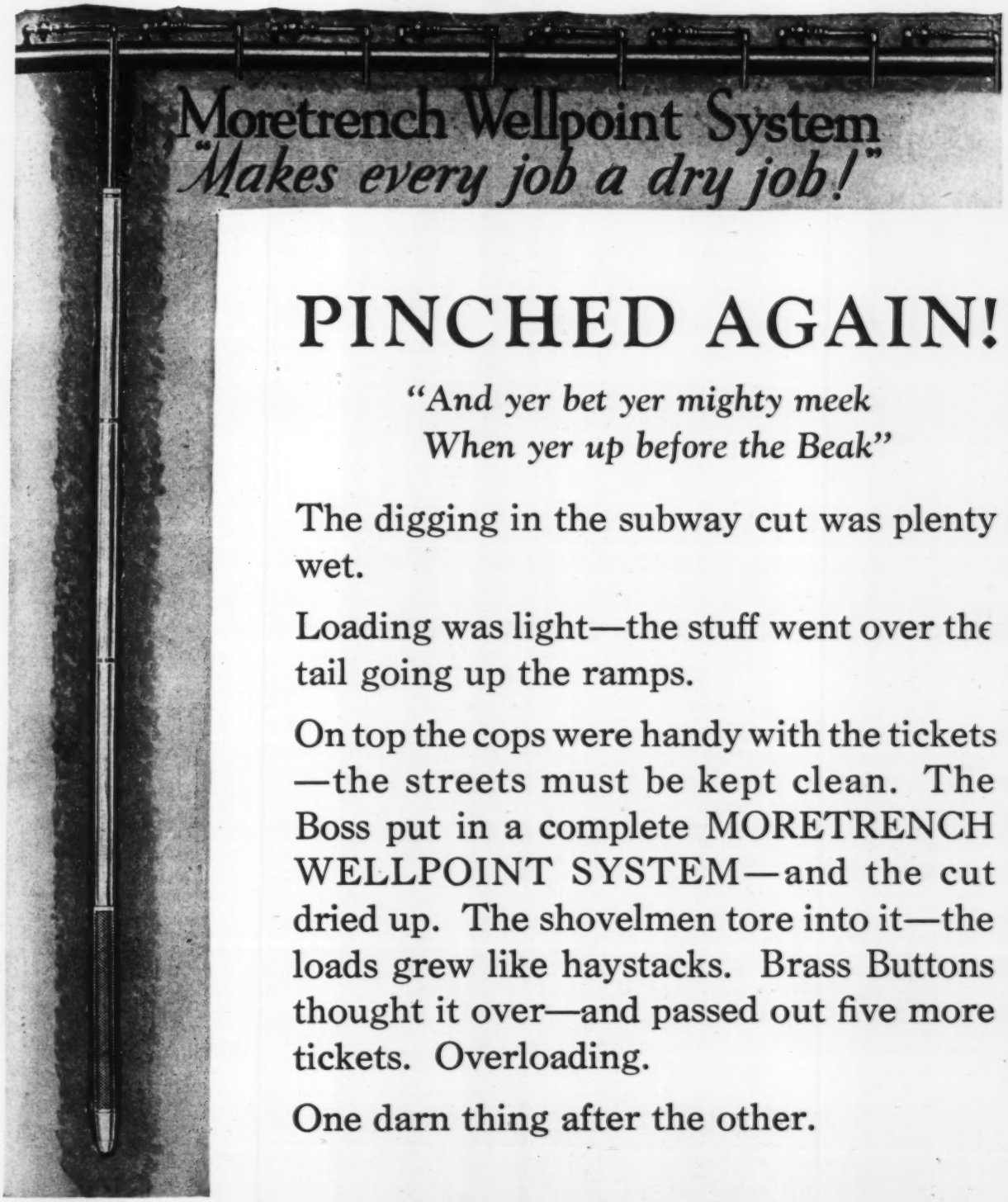

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"Makes every job a dry job!"

PINCHED AGAIN!

"And yer bet yer mighty meek
When yer up before the Beak"

The digging in the subway cut was plenty wet.

Loading was light—the stuff went over the tail going up the ramps.

On top the cops were handy with the tickets—the streets must be kept clean. The Boss put in a complete MORETRENCH WELLPOINT SYSTEM—and the cut dried up. The shovelmen tore into it—the loads grew like haystacks. Brass Buttons thought it over—and passed out five more tickets. Overloading.

One darn thing after the other.

Moretrench

MOORE TRENCH MACHINE CO., *Rockaway, N.J.*

CONVEYING EXCAVATORS
WELLPOINT SYSTEM

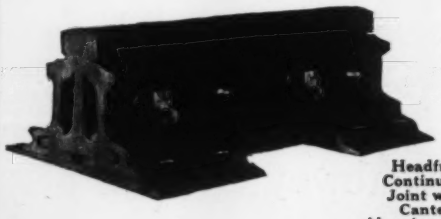
Reinforced

Headfree or Head Fishing

Continuous or 100% Joints

TEST STRONGER AND ARE TOUGHER

Than any similar bar, of the same composition and treatment, not having the reinforcing



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The Rail Joint Company

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Dump Cars for every construction requirement

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PORTER LOCOMOTIVES

PORTER better built locomotives

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Mancha's Electric Mule For Underground Work

MANCHA STORAGE BATTERY LOCOMOTIVE Co.

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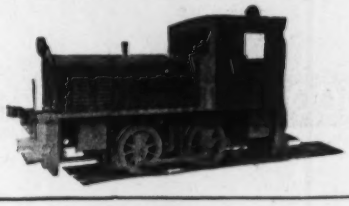

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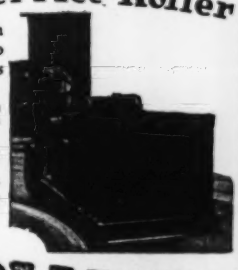

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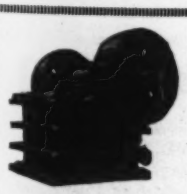

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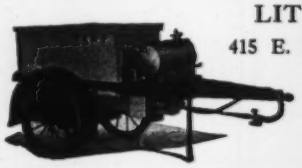

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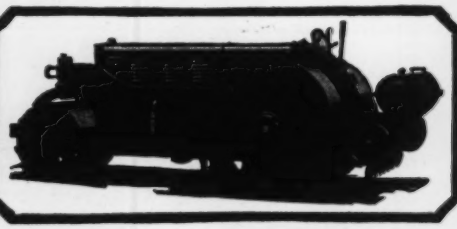

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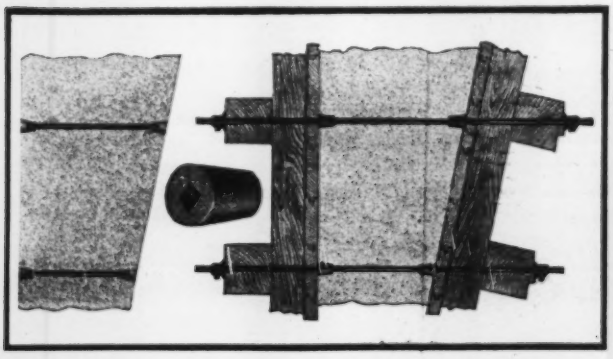

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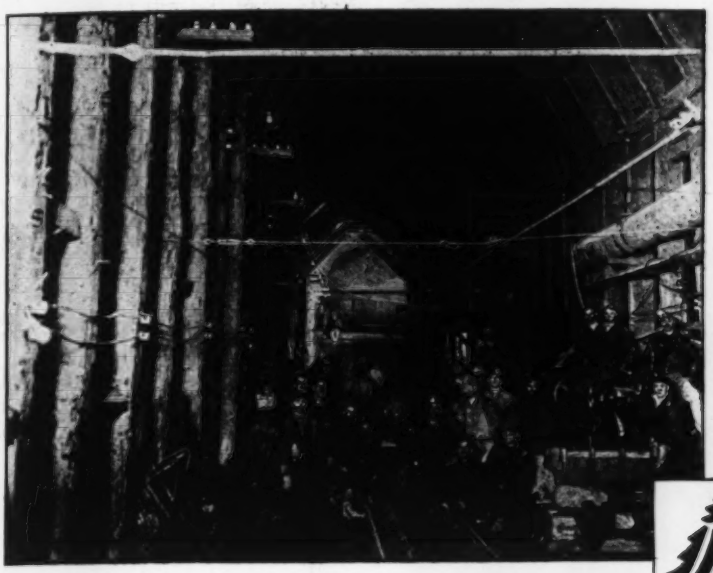

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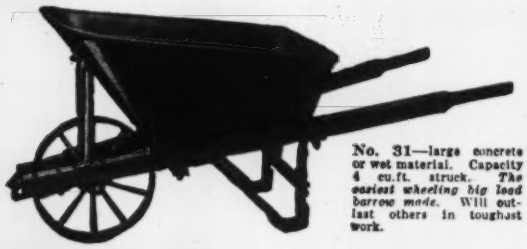

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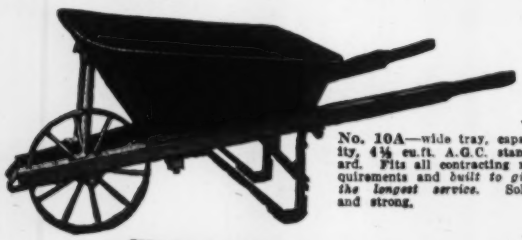

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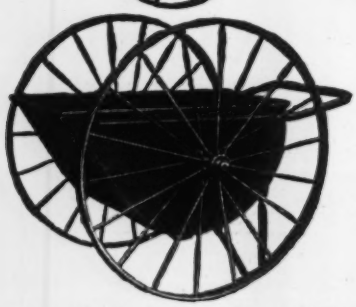

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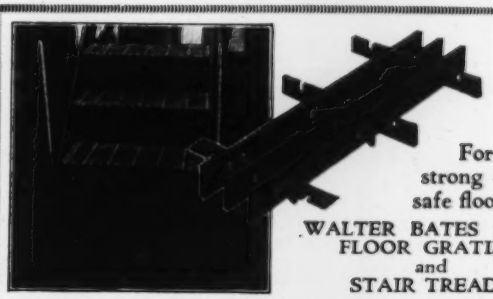

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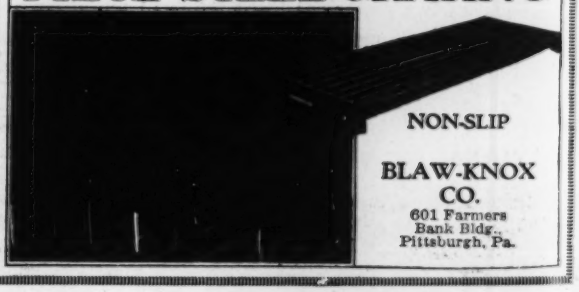

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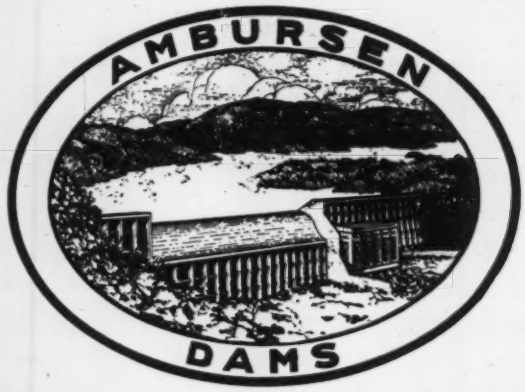

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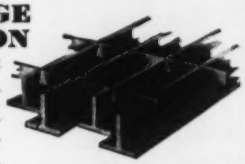

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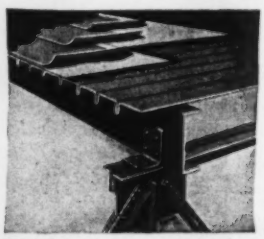

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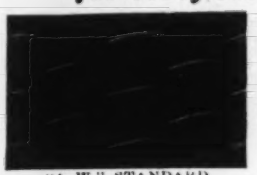

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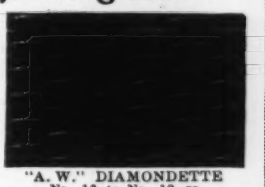

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Incidents like this, reflecting the utter reliability of Kohler Electric Plants, show why these machines are the usual choice of those who want the best electricity, for emergency or everyday service.

Kohler plants are widely used to aid in engineering work of every kind—to light work trains and camps, to floodlight excavating or construction projects, to supply mobile light or auxiliary power. Mail the coupon for information about models ranging from 800 watts to 10 K.W.

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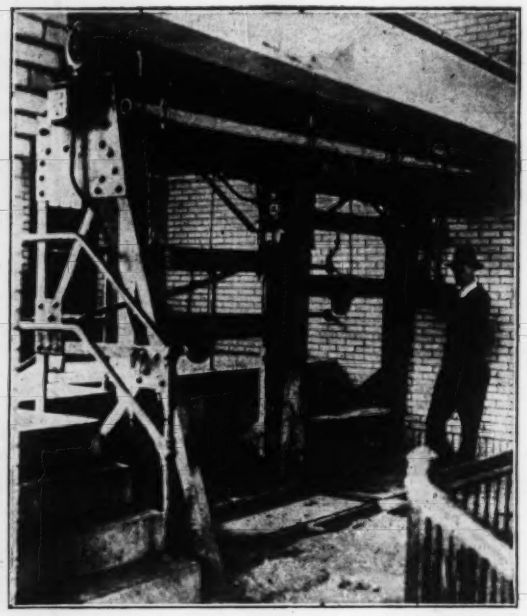

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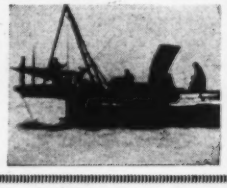

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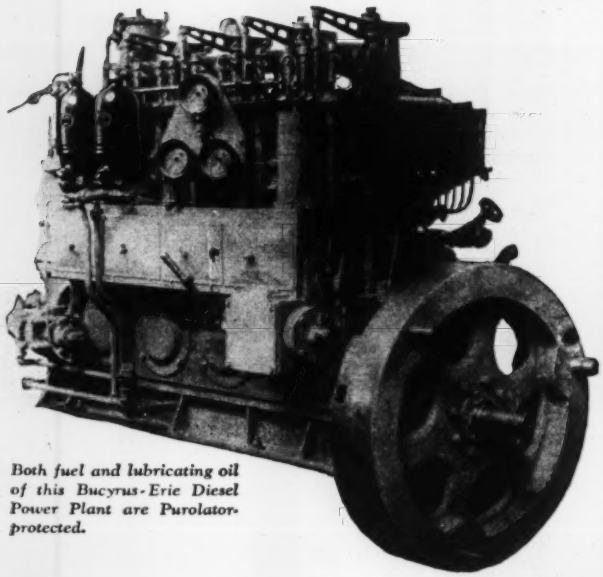

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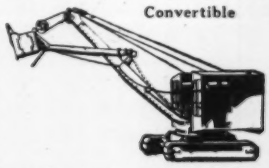

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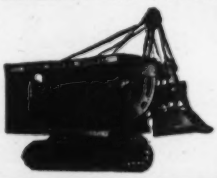

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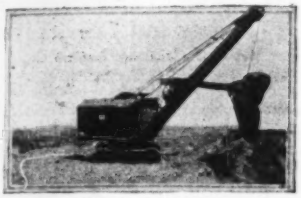

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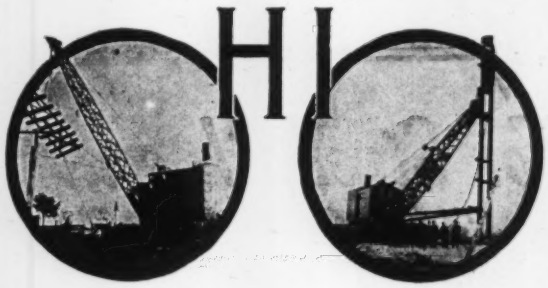

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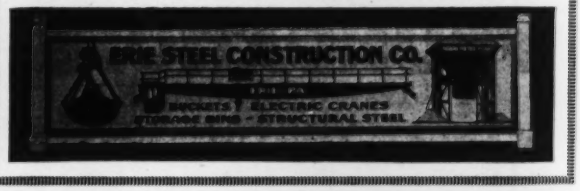

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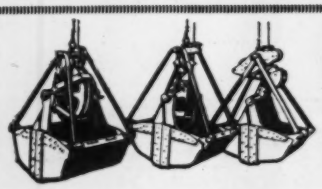

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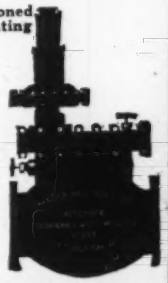

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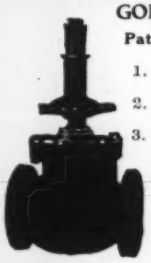

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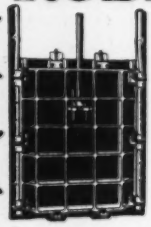

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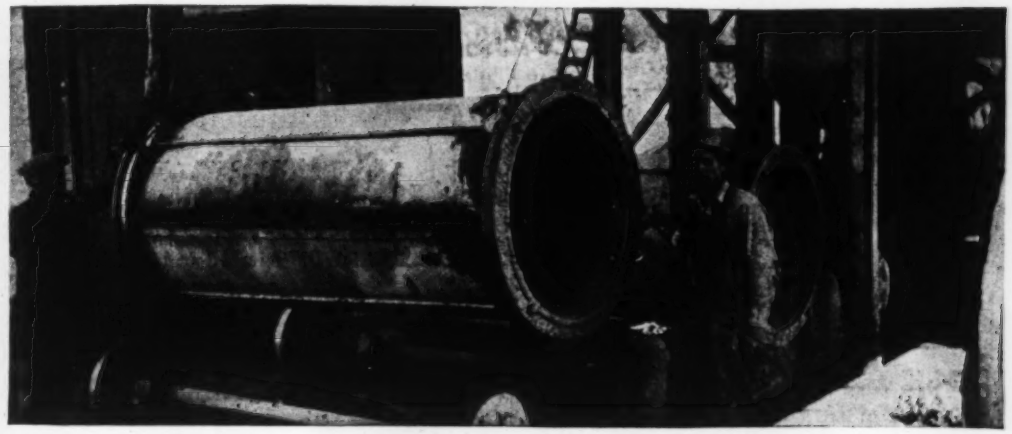

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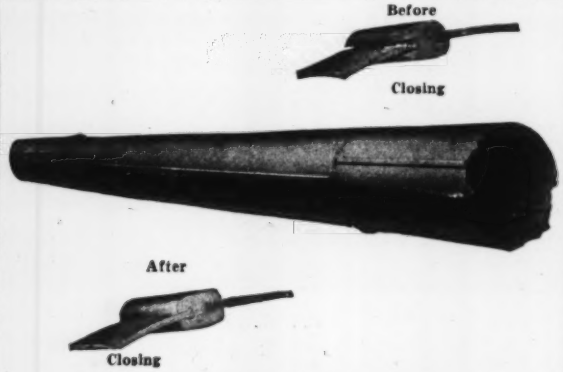

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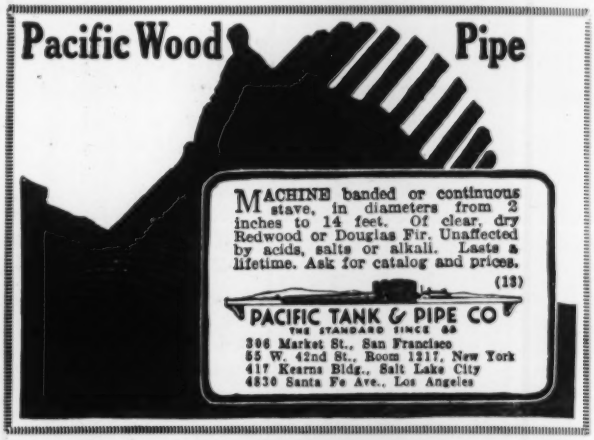

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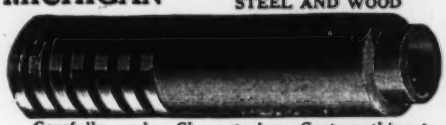

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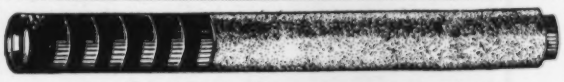

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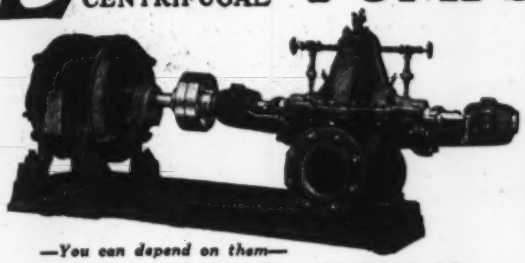

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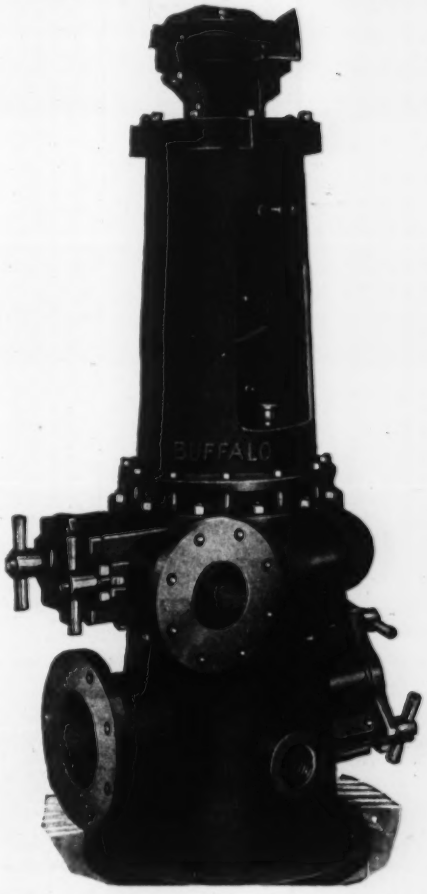

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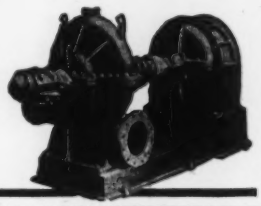

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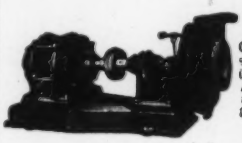

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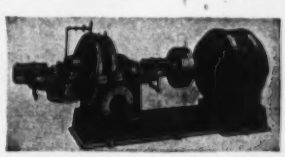

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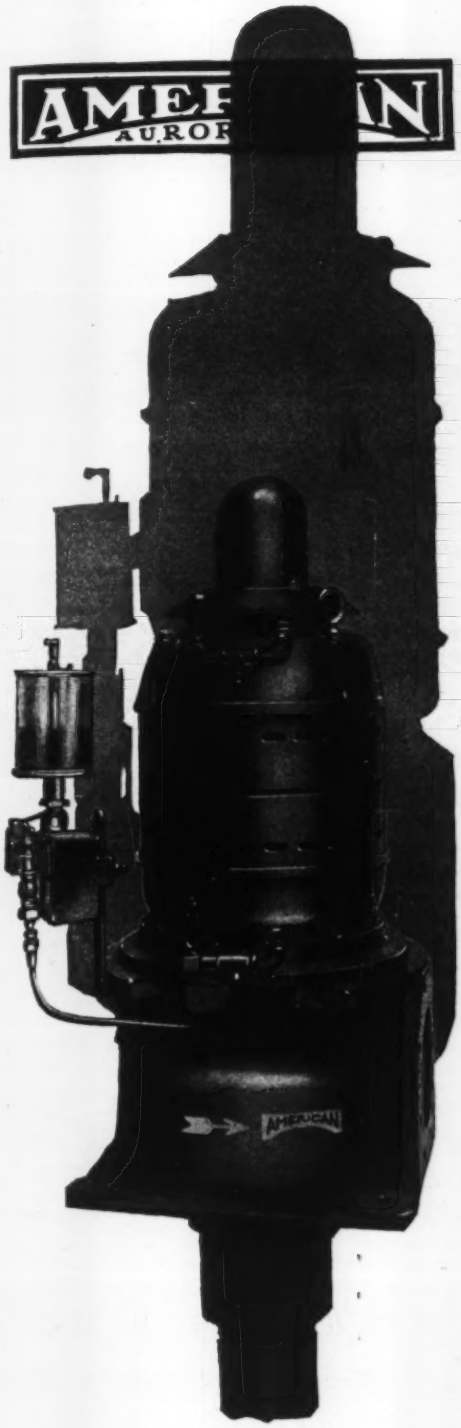

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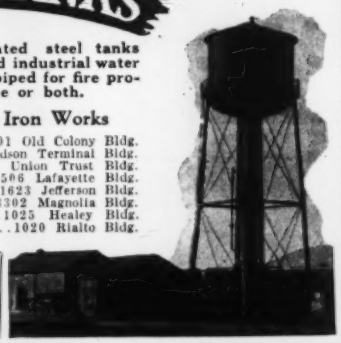

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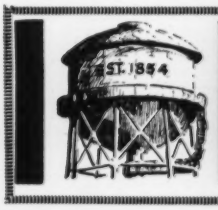

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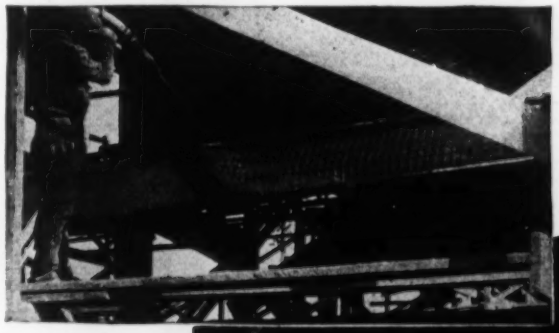

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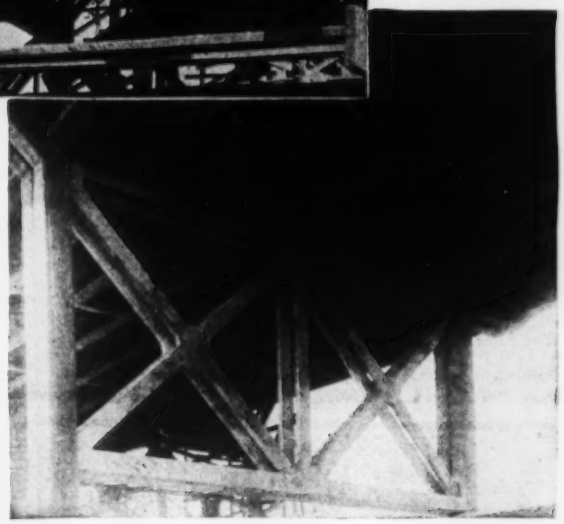

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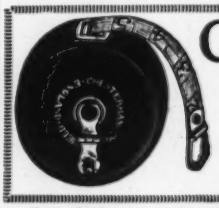

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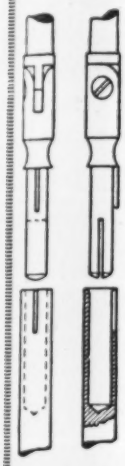

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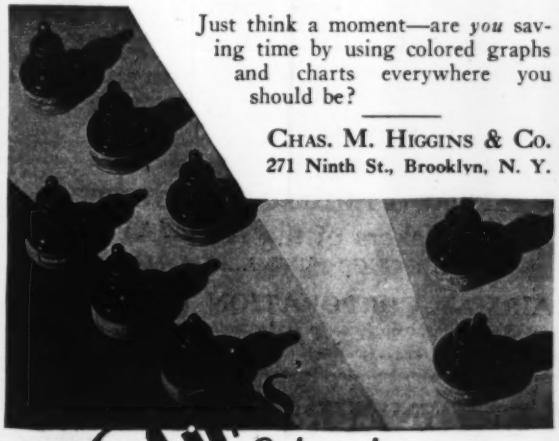

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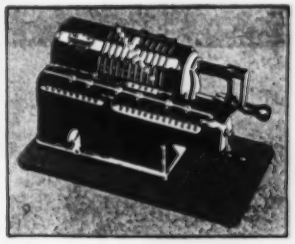

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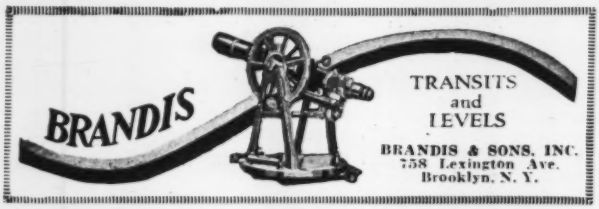

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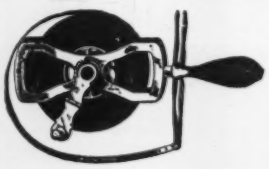

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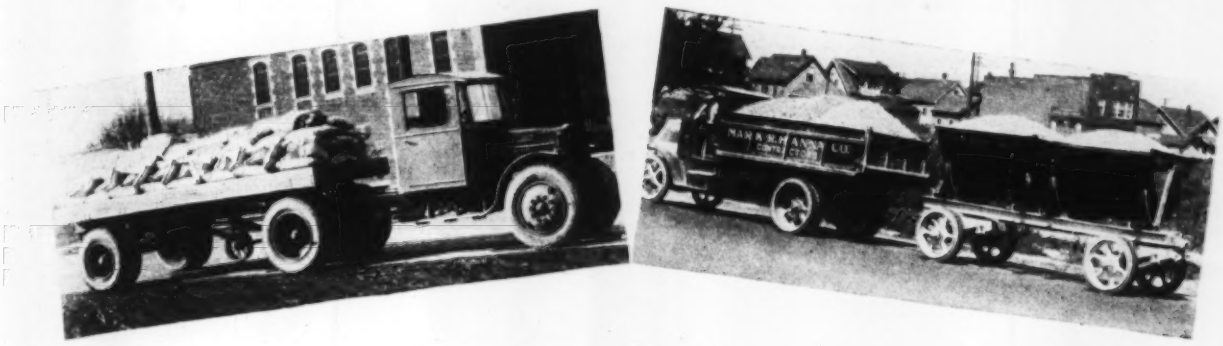

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Plans and Specifications for inspection by distant bidders may be filed at any of the Engineering News-Record offices without charge.

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E. N.-R.

OFFICIAL PROPOSALS

Bids: July 16.

Construction of Chester River Inverted Siphon

City of Chester, Pa.
CONTRACT NO. 11

Sealed proposals for the construction of the Chester River Inverted Siphon, designated as Contract No. 11, complete with all equipment and appurtenances, will be received at the office of the Superintendent of Streets and Public Improvements, until one o'clock p.m. Standard Time, or two o'clock p.m. Daylight Saving Time, July 16, 1929, and there deposited in a box for that purpose and then publicly opened in Council.

The work consists of a Cast Iron Pipe Inverted Siphon in the Bed of Chester River at a point south of the Second Street Bridge, inlet chamber on property of the City of Chester on the east bank of the river, outlet chamber and curved conduit on the property of the City of Chester on the west bank of the river; and all equipment necessary for the proper operation of the siphon.

These bids shall be in accordance with the plans and specifications on file in the office of the City Engineer, Chester, Pa., and in the office of Robert C. Wheeler, Consulting Engineer, 36 State Street, Albany, New York. Plans and specifications may be obtained from the Superintendent of Streets and Public Improvements, Chester, Pa.

All proposals must be accompanied by a certified check made payable to the City of Chester for the amount of 5% of the bid. Bids for the construction of the Chester River Inverted Siphon will be compared on the basis of the approximate quantities given in the proposal form which is attached to the specifications.

A deposit of $10.00 will be required for the specifications which will be returned after the opening of the bids by Council and the return of the specifications.

The successful bidder must furnish a Surety Bond, subject to the approval by Council for 50% of the amount of the contract, guaranteeing the proper completion of the work.

The contractor upon bidding, shall name a Surety Company authorized to do business in the State of Pennsylvania, for the Surety Bond, or the bid will be considered informal, and shall submit therewith the financial statement of the said company.

The Surety company named must be a surety company that has been properly registered with the City Clerk of the City of Chester. As to the requirements of this registration, the prospective bidder or bidders may receive such information from the office of the City Clerk.

A copy of the advertisement must accompany the proposal. If the advertisement does not accompany the proposal, the bid will be considered informal. Council reserves the right to reject any and all bids.

The proposal sheet required a bid for 23 items, of which the following are the most substantial.

Approximately 1,100 cubic yards of earth excavation.
Approximately 500 cubic yards of rock excavation.
Approximately 265 cubic yards of first class concrete.
Approximately 70 cubic yards of second class Concrete.
Approximately 31,000 pounds metal reinforcement.
Approximately 40 tons 20-inch and 24-inch cast iron pipe and specials.

Miscellaneous items, such as stop logs, sluice gates, valves, pumps, wire fencing, piling, etc.

G. J. HUNTER, Superintendent,
Streets and Public Improvements.

ATTEST: BENJ. NEWSOME, City Clerk.

OFFICIAL PROPOSALS

Bids: July 1.

State Road Work

Hartford, Conn.

SEALED PROPOSALS will be received by the State Highway Commissioner, 12 Washington Street, Hartford, Conn., until 1:00 p.m., Eastern Standard Time, July 1, 1929, for the following sections of state work, in accordance with plans and specifications on file at the following places:

TOWNS OF BOLTON AND MANCHESTER: About 16,856 ft. of reinforced concrete pavement on the Manchester-Willimantic Road. NOTE: The State will furnish cement, bituminous coated corrugated metal pipe and reinforced concrete pipe. Plans and proposal forms in the office of R. W. Stevens, Division Engineer, 15 Lewis St., Hartford, Conn.

TOWN OF COVENTRY AND MANSFIELD: A concrete encased girder bridge and about 603 ft. of bituminous macadam at the Willimantic River on Route 109. NOTE: The State will furnish cement and bituminous material. Plans and proposal forms in the office of R. W. Stevens, Division Engineer, 15 Lewis Street, Hartford. See also special provisions on this work.

TOWN OF HARTLAND: About 5,292 ft. of crushed gravel on the Hartland-West Hartland Road. NOTE: The State will furnish bituminous coated corrugated metal pipe. Plans and proposal forms in the office of D. C. Loewe Division Engineer, Winsted, Conn.

TOWN OF PLAINVILLE: About 6,600 ft. of reinforced concrete on East St. NOTE: The State will furnish cement and reinforced concrete pipe. Plans and proposal forms in the office of R. W. Stevens, Division Engineer, 15 Lewis Street, Hartford, Conn.

TOWN OF SALISBURY: About 22,879 ft. of trap rock waterbound macadam on the road from Lime Rock Bridge to the Hotchkiss School. NOTE: The State will furnish cement and bituminous coated corrugated metal pipe. Plans and proposal forms in the office of D. C. Loewe, Division Engineer, Winsted, Conn.

TOWN OF WARREN: About 15,210 ft. of waterbound macadam on the Woodville Road. NOTE: Alternate bids will be received using broken stone or crushed gravel. The State will furnish reinforced concrete pipe. Plans and proposal forms in the office of George E. Smith, Division Engineer, New Milford, Conn.

TOWN OF WASHINGTON: A 75-ft. steel truss superstructure over the Shepaug River on the Washington Depot-New Preston Road. NOTE: The State will furnish cement. Plans and proposal forms in the office of G. E. Smith, Division Engineer, New Milford, Conn.

TOWN OF WILTON: About 9,122 ft. of waterbound macadam on Hurlbutt St. NOTE: The State will furnish reinforced concrete pipe. Plans and proposal forms in the office of G. E. Smith, Division Engineer, New Milford, Conn.

All bids must be accompanied by a surety company bond or a certified check not less than one-third of the cost of the work. The State Highway Commissioner reserves the right to reject any and all bids.

Dated at Hartford, Conn., June 20, 1929.

JOHN A. MACDONALD,
State Highway Commissioner,
12 Washington Street, Hartford, Conn.

OFFICIAL PROPOSALS

Bids: July 18.

Construction of Dam and Lake

AT ALLEGANY STATE PARK
Near Salamanca, New York.

Sealed proposals will be received by the undersigned at the Administration Building of Allegany State Park, Red House, New York, until 2 p.m. (Eastern Standard Time), July 18, 1929, when all bids properly received will be publicly opened and read for the construction of:

Earthen dam and concrete core wall approximately fifteen hundred and fifty (1,550) feet long and twenty-five (25) feet average height.

Concrete spillway (gravity section) approximately twenty-seven (27) feet high, with concrete arch bridges over spillway approximate total length one hundred and sixty-five (165) feet by thirty (30) feet total width of concrete roadway and sidewalks.

Three proposed islands and other improvements in proposed lake.

Plans and specifications may be inspected and proposal forms obtained at the Engineer's Office at the Administration Building, or copies for the use of prospective bidders may be obtained at the same address upon the payment of a deposit of twenty-five dollars ($25.00) which sum will be refunded provided said plans and specifications are returned in good condition, within fifteen (15) days after the opening of bids.

All proposals must be made on the official proposal blank, and must be accompanied by a certified check payable to the Allegany State Park Commission in an amount equal to five per cent (5%) of the total lump sum bid.

The Commission reserves the right to reject any or all bids, or to accept such bids as they may deem to be for the best interest of the State of New York.

ALLEGANY STATE PARK COMMISSION
By D. H. AMES,
Executive Secretary.

Dated: June 18, 1929.

Bids: July 9.

Reinforced Concrete Bridge

WESTCHESTER COUNTY PARK COMMISSION
CONTRACT NO. 233

Yonkers, N. Y.

Sealed bids for the construction of a stone faced reinforced concrete bridge at Kimball Avenue on the Cross County Parkway in the City of Yonkers, Westchester County, N. Y., will be received at the office of the Westchester County Park Commission, 72 West Pondfield Road, Bronxville, N. Y., until 11:30 a.m., Daylight Saving Time, July 9, 1929, when the bids received will be publicly opened and read.

The principal items of the contract are:

Earth Excavation	1,600 cu.yds.
Rock Excavation	1,700 cu.yds.
Fill	4,700 cu.yds.
Portland Cement	3,000 bbls.
Reinforcing Steel	107,000 lbs.
Cement	1,600 cu.yds.
Granite Masonry	165 cu.yds.
Stone Masonry	100 cu.yds.

Pamphlets containing information for bidders, form of proposal, contract drawings and specifications may be obtained by intending bidders at the above address by depositing $5.00 for same.

The right is reserved to reject any or all bids.

WESTCHESTER COUNTY PARK COMMISSION
By JAY DOWNER,
Chief Engineer.

Dated: June 20, 1929,
Bronxville, N. Y.

OFFICIAL PROPOSALS

Bids: July 6.

Town Road Construction

White Plains, New York.
June 13, 1929.

Sealed bids or proposals for the improvement with Bituminous Macadam of Mahopac Avenue in the Town of Somers and North Salem, from S.H. No. 5464 to the Putnam County Line, and Daisy Lane Road in the Town of Somers from C.H. No. 775 to the Putnam Line, a total distance of 0.69 mile in the Town of Somers and North Salem, will be received at the office of the County Engineer, Fifth Floor, Court House, White Plains, New York, until 10 a.m. (Daylight Saving Time), July 6, 1929.

Pavement to be Bituminous Macadam.

Principal items of construction are as follows:

Excavation .....2,800 cubic yards
Sub-base Bottom Course..1,360 cubic yards
Bituminous Material....18,500 gals.

Plans, specifications and all information relative to same may be procured at the office of the County Engineer, upon making a deposit of Ten ($10.00) Dollars, which will be refunded if plans are returned in good condition within thirty (30) days of the date of receiving bids.

THOMAS FLOOD,
Town Superintendent of Highways, Somers.
ELLA M. BRADY,
Town Clerk, Somers.
BENJAMIN VAN SCOY,
Town Supt. of Highways, North Salem.
NATHAN H. MINOR,
Town Clerk, North Salem.

Bids: July 8.

Sewers

Scarsdale, N. Y.

Sealed proposals for the construction of various trunk and lateral sewers in Sewer District No. 3 of the Village of Scarsdale, N. Y., will be received until 10:00 a.m. (Daylight Saving Time) on Monday, July 8, 1929, and will then be publicly opened and read in the office of the Village Engineer at the Village Hall on Post Road, near Popham Road, Scarsdale, N. Y.

Plans, specifications and blank forms of proposals may be obtained in the office of the Village Engineer on payment of the charge of $10.00.

Proposals must be made on the blank forms provided and must be accompanied by a certified check amounting to $3,000 made to the order of the Village Treasurer. The amount of the bond to be furnished when contract is executed will be the amount of the contract price as computed from the accepted bid.

The proposed work consists of approximately:

11,000 lin. ft. of 8 in. vitrified sewer.
1,400 lin.ft. of 8 in. Cast Iron Sewer. with manholes, Y-Branches and appurtenances; also 4,300 lin.ft. piling in place.

The right is reserved to reject any or all bids.

Dated Scarsdale, June 13, 1929
By order of the Board of Trustees.
JOHN R. ROSS,
Village Clerk.

Bids: July 17.

Constructing Canal and Pipe Lines, Etc.

New Orleans, La.

New Orleans, May 9, 1929: Separate sealed proposals will be received by the Sewerage and Water Board of New Orleans, at the office of the Secretary, Room 401, No. 526 Carondelet Street, up to 12 o'clock, noon, of Wednesday, July 17th, 1929, for: CONT. 204-D, Constructing Lined and Covered Drainage Canal and Pipe Lines in St. Claude St., from Jourdan Avenue to St. Bernard Parish Line; Cont. 200-S, Motors, Switchboards, Transformers and Accessories for Stations 15, 17, 18 and B; and CONT. 201-S, Constructing Sewage Pumping Stations 16, 17 and 18. Plans and Specifications may be obtained at the office of the Board. Deposits to guarantee return of each set of plans and specifications will be required as follows: CONT. 204 D $25, CONT. 200-S $10, CONT. 201-S $100. The right is reserved to reject any or all bids.

GEO. G. EARL,
Gen'l Supt.
A. G. MOFFAT, Secretary.

OFFICIAL PROPOSALS

Bids: July 2.

Heating and Electric Work Service Connections

SPEC. NOS. 5563 and 5502

Ogdensburg, N. Y.

Separate sealed proposals covering Heating and Electric Work, Service Connections, Tuberculosis Pavilion, Reception Hospital and Nurses Home, St. Lawrence State Hospital, Ogdensburg, N. Y., in accordance with Specifications Nos. 5563 and 5502 and accompanying drawings, will be received by the Commissioner, Department of Mental Hygiene, Capitol, Albany, N. Y., until 2 o'clock p.m. (Eastern Standard Time) on Tuesday, July 2, 1929. Proposals shall be accompanied by a certified check or money deposit of 5% of the amount of the bid. Successful bidders will be required to give a bond in the sum of 50% of the amount of the contract. Drawings and specifications may be examined free of charge at the following offices:

Commissioner of Architecture, 949 Broadway, New York City.
Commissioner of Architecture, 353 Broadway, Albany, N. Y.
District Engineer, 109 N. Genesee Street, Utica, N. Y.
District Engineer, Weighlock Building, Syracuse, N. Y.
District Engineer, Barge Canal Terminal, Rochester, N. Y.
District Engineer, Barge Canal Terminal, Buffalo, N. Y.
District Engineer, 71 Frederick St., Binghamton, N. Y.
St. Lawrence State Hospital, Ogdensburg, N. Y.

Proposal blanks and envelopes may be obtained and drawings and specifications may be purchased by general or subcontractors from the Commissioner of Architecture, 353 Broadway, Albany, N. Y., upon a payment of $2.00 for each set of Heating and Electric drawings and specifications.

There will be no return of the money paid for such drawings and specifications.

DATED: June 4, 1929.

Bids: July 10.

Sewers and Water Lines

SYRACUSE STATE SCHOOL,
FAIRMOUNT FARMS

Onondaga County, N. Y.

Sealed proposals for constructing sewers and water lines and work incidental thereto at the Syracuse State School, Fairmount Farms, Onondaga County, N. Y., will be received at the Department of Mental Hygiene, Capitol, Albany, N. Y., at 2 p.m., Daylight Saving Time, July 10, 1929, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Constructing Sewers and Water Lines, Syracuse State School, Fairmount Farms, Onondaga County, N. Y.," and addressed to the Department of Mental Hygiene, Capitol, Albany, N. Y., and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the Department of Mental Hygiene, or money, equal to not less than Five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in amount of Fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Department of Mental Hygiene, Albany, N. Y., at the office of the Chief Engineer, Division of Engineering, Department of Public Works, 353 Broadway, Albany, N. Y., at the office of the District Engineer, Department of Public Works, Weighlock Building, Syracuse, N. Y., and at the office of the Superintendent, Syracuse State School, Fairmount Farms, Onondaga County, N. Y. Plans and specifications for this contract will be furnished by the Chief Engineer, Division of Engineering, Department of Public Works, upon payment of $2.10. The estimated cost of this project is $26,697.

DEPARTMENT OF MENTAL HYGIENE,
F. W. PARSONS, Commissioner.

OFFICIAL PROPOSALS

Bids: July 2.

Driven Well

State Police Barracks,
Westchester County, N. Y.

Sealed proposals for installing a driven well at the State Police Barracks, Westchester County, New York, will be received at the Executive Department, Division of State Police, 190 State Street, Albany, New York, at 3 p.m., Daylight Saving Time, July 2, 1929, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Installing Driven Well, State Police Barracks, Westchester County, New York," and addressed to the Executive Department, Division of State Police, 190 State Street, New York, and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the Division of State Police, or money, equal to not less than five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in amount of fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Plans and specifications for this contract may be examined at the office of the Executive Department, Division of State Police, 190 State Street, Albany, N. Y., at the office of the Chief Engineer, Division of Engineering, Department of Public Works, 353 Broadway, Albany, N. Y., and at the office of the District Engineer, Department of Public Works, Pleasant Valley Road, Poughkeepsie, N. Y. Plans and specifications for this contract will be furnished by the Chief Engineer, Division of Engineering, Department of Public Works, upon payment of $0.50. The estimated cost of this project is $2,325.

EXECUTIVE DEPARTMENT,
DIVISION OF STATE POLICE
JOHN A. WARNER, Superintendent.

Bids: July 5th, 1929.

South Yonkers Project

White Plains, N. Y.

Pursuant to Chapter 603 of the laws of New York, 1926, and laws amendatory thereof.

SEALED BIDS, in opaque envelopes, each addressed to this Commission from Contractors having experience in work of similar character and magnitude, will be received up to 2:00 p.m., Daylight Saving Time on July 5th, 1929, at the office of this Commission, and then publicly opened and read aloud; all bids shall be accompanied under separate cover by a

CERTIFIED CHECK made payable without condition to this Commission, for $15,000; which check, or its proceeds, are to be returned after execution of the contract with bond for full amounts bid, or retained as liquidated damages in case of failure to duly execute such contract or bond, if awarded; for furnishing all labor, plant and materials for the tight and enduring

CONSTRUCTION in 60 calendar days of Section A, which comprises about ¾ mile of gravel road and, underlying, 4 foot class A cast iron sewer, conduits and pipes, with all connections and appurtenances; extending from Valentine Lane in Yonkers to the fee property of the Westchester County Sanitary Sewer Commission.

PLANS AND SPECIFICATIONS, Invitation to Contractors, forms for Bids, Contract and Bond may be obtained at the office of this Commission after June 24th, 1929, from the Secretary upon the payment of $20.00 per set to be repaid when the same is properly used in bidding, or returned unimpaired within 10 days of the bidding date. Copies will also be sent to the New York office of Engineering News-Record. General plans are now on view at the White Plains office of the Commission.

CONTRACTOR'S BID must fulfill the requirements of the Invitation to Contractors, and be made out upon the printed and bound forms for Bids as above obtained, and the Commission reserves to itself the right to reject any or all bids, or to accept that one of them whose acceptance will, in its judgement, best secure the public interest and efficient work.

WESTCHESTER COUNTY SANITARY
SEWER COMMISSION
EUGENE S. MARTIN, Secretary.
192 Martine Avenue, White Plains, N. Y.
Telephone W. P. 7780.
Dated: May 24th, 1929.

OFFICIAL PROPOSALS

Bids: July 11.

Water Surface System

NEW YORK STATE COLLEGE OF FORESTRY

Wanakena, St. Lawrence County, N. Y.

Sealed proposals for constructing water supply system at the New York State College of Forestry, Wanakena, St. Lawrence county, New York, will be received at the Department of Education, Education Building, Albany, N. Y., at 2 P. M., Daylight Saving Time, July 11, 1929, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposals for Water Supply System, New York State College of Forestry, Wanakena, New York," and addressed to the Education Department, Education Building, Albany, N. Y., and shall be accompanied by a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the Education Department, or money, equal to not less than five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in amount of fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Education Department, Education Building, Albany, N. Y., at the office of the Chief Engineer, Division of Engineering, Department of Public Works, 353 Broadway, Albany, N. Y., at the office of the District Engineer, Department of Public Works, 58 Public Square, Watertown, N. Y., and at the office of the Superintendent of the New York State College of Forestry, Syracuse, N. Y. Plans and specifications for this contract will be furnished by the Chief Engineer, Division of Engineering, Department of Public Works, upon payment of $1.75. The estimated cost of this project is $37,175.

EDUCATION DEPARTMENT,
FRANK P. GRAVES,
Commissioner.

Intercepting Sewers

Hinsdale, Illinois.

Hinsdale, Illinois, Sanitary District plans and specifications now available from Pearse, Greeley and Hansen, Engineers, 6 North Michigan Ave., Chicago. Intercepting sewer comprises 7¾ miles of sewer ranging from twelve to forty-two inches in diameter. Treatment works, designed for population of eighteen thousand, comprise pumping station, Imhoff tanks, trickling filters, final sedimentation and appurtenances.

OFFICIAL PROPOSALS

Bids: July 1.

Bridges

STATE OF NEW JERSEY
STATE HIGHWAY COMMISSION

Trenton, N. J.

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commission of New Jersey for:

Bridges on Route No. 25, Section No. 8A

Construction of three bridges on Route No. 25, Section No. 8A, in Rahway and Linden, Union County. The principal items of construction are:

Estimated: 610 cu. yds. concrete
20,900 lbs. reinforcing steel
48,800 lbs. structural steel

Bids for the above will be received at the office of the State Highway Commission, State House Annex, West State Street, Trenton, New Jersey, on Monday, July 1st, 1929, at twelve o'clock Noon, DAYLIGHT SAVING TIME (eleven oclock, 11:00 A. M. Eastern Standard Time), and will be opened and read immediately thereafter.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the state Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders. Plans will be furnished on a deposit of Ten Dollars ($10) for each set of plans and specifications upon application to the State Highway Department, Room 102, State House Annex, Trenton, New Jersey. Bids must be made on the standard proposal forms in the manner designated in the 1926 standard bridge specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten per cent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelope will be furnished on application. Bids not enclosed in special addressed envelopes will be considered informal and will not be opened.

Each bidder must also accompany his bid with a certificate from a surety company duly authorized to do business in this State, stating that such surety company will provide said bidder with a bond in such sum as is required in and in accordance with the provisions of the said specifications, conditioned for the faithful performance of the provisions of the contract and specifications. Each bidder must also accompany his bid with a Statement of Equipment properly filled out.

By order of the State Highway Commission. A. LEE GROVER, Chief Clerk.

OFFICIAL PROPOSALS

Bids: July 2.

State Highway Work

DEPARTMENT OF PUBLIC WORKS
STATE OF MARYLAND
STATE ROADS COMMISSION

Baltimore, Md.

Sealed proposals for building five sections of State Highway as follows:

MONTGOMERY COUNTY. Cont. M-123. One section of State Highway along the Etchison-Damascus road from the end of Cont. M-120 to Damascus, a distance of 3.2 miles. (Concrete.)

PRINCE GEORGE'S COUNTY. Cont. P-94. One section of State Highway along the Brandywine-Aquasco road from the end of Cont. P-90 toward Aquasco, a distance of 4.0 miles. (Gravel.)

ST. MARY'S COUNTY. Cont. Sm-54. One section of State Highway from the Valley Lee-Porto Bello Road to Drayden P. O., a distance of 0.25 mile, and from the end of Cont. Sm-37 through St. George's Island, a distance of 0.5 mile, making a total distance of 0.75 mile. (Gravel.)

KENT COUNTY. Cont. K-36. One section of State Highway along the Millington-Delaware Line road from the end of Cont. K-34 to the Delaware Line, a distance of 3.3 miles. (Concrete.)

WASHINGTON COUNTY. Cont. W-63. One section of State Highway along Potomac Street in Williamsport, a distance of 0.47 mile. (Amiesite surfacing on Macadam base.)

will be received by the State Roads Commission, at its offices, Federal Reserve Bank Building, Calvert and Lexington Sts., Baltimore, Maryland, until 12 M. on the 2nd day of July, 1929, at which time and place they will be publicly opened and read.

Bids must be made upon the blank proposal form which, with specifications and plans will be furnished by the Commission upon application and cash payment of $1.00, as hereafter no charges will be permitted.

No bids will be received unless accompanied by a certified check for the sum of Five Hundred ($500) Dollars, payable to the State Roads Commission.

The successful bidder will be required to give bond, and comply with the Acts of the General Assembly of Maryland, respecting contracts.

The Commission reserves the right to reject any and all bids.

By Order of the State Roads Commission this 18th day of June, 1929.

G. CLINTON UHL, Chairman.
L. H. STEUART, Secretary.

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OFFICIAL PROPOSALS

Bids: July 9.

Foundations for Steel Standpipe

Scarsdale, N. Y.

CONTRACT "A"

Proposals in sealed envelopes marked "Martello Tower, Contract 'A' Scarsdale, N. Y.," will be received by the Village Engineer of the Village of Scarsdale, at the Village Hall, Scarsdale, N. Y., until 10 a.m. (Daylight Saving Time) on the 9th day of July, 1929, and then publicly opened and read. These proposals shall cover the excavation of about 650 cubic yards of rock and earth, and the placing of 650 cubic yards of concrete.

The Martello Tower project has been divided into three contracts. Foundations will be built under Contract "A"; the steel reservoir will be built under Contract "Bs"; the masonry tower, which is to enclose the steel reservoir, will be built under Contract "C."

Plans, specifications and blank forms of proposal may be obtained at the office of Sanborn and Bogert, 30 Church Street, New York City. A deposit of $5.00 will be required for plans and specifications furnished, which will be refunded to all bidders on their return.

Proposals must be accompanied by the consent in writing of a surety company qualified to do business in the State of New York, binding itself to become surety for the faithful performance of the contract in an amount equal to the full amount of the bid. All proposals must be accompanied by a certified check for five per cent of the amount of the bid as a guarantee of the good faith of the bidder. The checks of the unsuccessful bidders will be returned to them within two weeks after receiving the proposals, if no award is made within that time.

Proposals must be submitted on the form prepared for the purpose. Bidders must submit with the proposal, detailed statements of their qualifications for undertaking work of this nature.

The Board of Trustees reserves the right to reject any or all bids.

By order of

BOARD OF TRUSTEES
SCARSDALE, N. Y.
ROBERT E. CHRISTIE, JR., Mayor.
ARTHUR BONIFACE, Village Engineer.

Dated: June 24, 1929.
SANBORN AND BOGERT,
Consulting Engineers,
New York City.

Bids: July 10.

Sewers

DISTRICTS NOS. 3 AND 4
COSCOB

Greenwich, Conn.

Sealed proposals for constructing sewers in portions of Districts Nos. 3 and 4 will be received by the Town Sewer Commission, Greenwich, Conn., until 8 o'clock p.m. (d.s.t.) on the 10th day of July, 1929.

Principal details are approximately as follows:

66,000 lin.ft. sewer 8 inch to 24 inch diameter.
26,000 lin.ft. 5 inch house connections.
320 Manholes.

Plans and specifications may be seen at the office of the Town Sewer Commission, Town Hall, Greenwich, Conn., at the office of Clyde Potts, Consulting Engineer, 30 Church Street, New York City, and at the office of S. E. Minor & Co., Inc., Town Engineers, Smith Building, Greenwich, Conn.

Plans and specifications may be obtained at the office of the Town Engineers, upon depositing $25.00, which sum will be refunded to Contractors who submit bids and return plans in good condition within 10 days after bids are received. Deposit will not be refunded to parties who do not submit proposals.

Deposit of certified check in the amount of $30,000 required with bid.

The right is reserved to reject any or all bids, or to accept that one which seems to be for the best interests of the Sewer District.

HARRY C. FROST,
JAMES B. ANDERSON,
HENRY E. SENFT,
Sewer Commissioners of
the Town of Greenwich.
ALBERT S. MEAD, Clerk.

Dated at Greenwich, Conn.,
this 17th day of June, 1929.

OFFICIAL PROPOSALS

Bids: July 10.

Sewage Disposal System

WASSAIC STATE SCHOOL FOR MENTAL DEFECTIVES

Wassaic, Dutchess County, N. Y.

Sealed proposals for constructing a sewage disposal system at the Wassaic State School for Mental Defectives, Wassaic, Dutchess County, N. Y., will be received at the office of the Department of Mental Hygiene, Capitol, Albany, N. Y., at 2 p.m., Daylight Saving Time, July 10, 1929, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Constructing Sewage Disposal System, Wassaic State School for Mental Defectives, Wassaic, Dutchess County, N. Y.," and addressed to the Department of Mental Hygiene, Capital, Albany, N. Y., and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the Department of Mental Hygiene, or money, equal to not less than five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in amount of fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Department of Mental Hygiene, Capitol, Albany, N. Y., at the office of the Chief Engineer, Division of Engineering, Department of Public Works, 353 Broadway, Albany, N. Y., at the office of the District Engineer, Department of Public Works, Pleasant Valley Road, Poughkeepsie, N. Y., and at the office of the Department of Public Works, Pier 6, East River, New York City. Plans and specifications for this contract will be furnished by the Chief Engineer, Division of Engineering, Department of Public Works, upon payment of $3.85. The estimated cost of this project is $157,779.90.

DEPARTMENT OF MENTAL HYGIENE,
D. W. PARSONS, Commissioner.

Building Equipment

Decatur, Ill.

Carbon Dioxide Generating Equipment in Brick and Stucco Building and Appurtenances—$12,000.00. Plans and specifications available from Pearsel, Greeley & Hansen, 6 N. Michigan Ave., Chicago, Ill.

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COMMISSARY
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22 South Street
New York City

OFFICIAL PROPOSALS

Bids: July 19.

Bridge

Edinburg, Saratoga County, New York.

Sealed proposals for the construction of the Batchellerville Bridge in the town of Edinburg, Saratoga County, New York, will be received by the Board of Hudson River Regulating District at its office, 44 Howard Street, Albany, N. Y., until 1:00 p.m. Eastern Standard Time on July 15, 1929, at which time and place the proposals received will be publicly opened and read.

Maps, plans, specifications and estimates are on exhibition and proposal forms may be obtained at the offices of the Board of Albany, N. Y., and Northville, N. Y.

A set of the contract drawings may be obtained by intending bidders by depositing $25.00, which will be refunded upon the return of the plans in good order within ten days after the receipt of bids.

Each bid shall be submitted in a sealed envelope and plainly marked "Proposal for construction of Batchellerville Bridge, Contract 14."

The bridge will include 19 steel cantilever spans, each 150 feet long, erected on concrete piers and some of the approximate quantities involved are:

1,600 tons structural steel.
425 tons reinforcing steel.
10,000 cubic yards concrete.
6,000 cubic yards earth excavation.
28,000 cubic yards earth embankment.
1,200 cubic yards riprap.
27,000 lineal feet timber piling.

Each proposal must be accompanied by cash, draft or certified check, payable to the order of the Board of Hudson River Regulating District for five per centum (6%) of the amount of the proposal, as a forfeit by the successful bidder in case of refusal or failure to enter into a contract within ten days after the award.

The Board of Hudson River Regulating District reserves the right to reject any or all bids and advertise again for further bids.

A bond will be required for the faithful performance of the contract to the full amount of the estimated cost of the work according to the contract prices. Upon the execution of the contract and the approval of bonds, all deposits will be returned to the respective proposers.

BOARD OF HUDSON RIVER REGULATING DISTRICT.
G. WILLIAM McEWAN,
Secretary.
EDWARD H. SARGENT,
Chief Engineer.

June 19, 1929.

Bids: July 18.

Electric Elevator

SPEC. NO. 5513

Albany, N. Y.

Sealed proposals covering Electric Elevator, West Wing, State Department of Health, Division of Laboratories and Research, Albany, N. Y., in accordance with Specification No. 5513, and accompanying drawing will be received by the Commissioner, Department of Health, Capitol, Albany, N. Y., until 2:00 o'clock p.m. (Eastern Standard Time) on Thursday, July 18, 1929.

Proposals shall be accompanied by a certified check or money deposit of 5% of the amount of the bid. Successful bidder will be required to give a bond in the sum of 50% of the amount of the contract. Drawings and specifications may be examined free of charge at the following offices:

Commissioner of Architecture, 949 Broadway, New York City.
Commssioner of Architecture, 353 Broadway, Albany, N. Y.
District Engineer, 109 N. Genesee St., Utica, N. Y.
District Engineer, Weighlock Building, Syracuse, N. Y.
District Engineer, Barge Canal Terminal, Buffalo, N. Y.
District Engineer, Barge Canal Terminal, Rochester, N. Y.
District Engineer, 71 Frederick St., Binghamton, N. Y.

Proposal blanks and envelopes may be obtained and drawings and specifications may be purchased by general or subcontractors from the Commissioner of Architecture, 353 Broadway, Albany, N. Y., upon a payment of $1.00.

There will be no return of the money paid for such drawings and specifications.

DATED: June 7, 1929.

OFFICIAL PROPOSALS

Bids: July 9.

State Highway Work

STATE DEPARTMENT OF PUBLIC WORKS—DIVISION OF HIGHWAYS

Albany, N. Y.

Sealed proposals will be received by the undersigned at the office, State Public Works Building, 353 Broadway, Albany, N. Y., until one o'clock p.m., advanced standard time, which is twelve o'clock noon, eastern standard time, on Tuesday, July 9, 1929, for the improvement of highways in the following counties:

	Deposit Required
MONROE—	
(One highway: 2.42 miles)....	$8,000.00
SULLIVAN—	
(One highway: 11.23 miles)....33,000.00	
Also for the reconstruction of the following:	
ALBANY—	
(One contract: 1.96 miles)....	11,000.00
HERKIMER—	
(Two bridge contracts: 0.09 and 0.1 mile) .....1,700.00 and	2,500.00
LIVINGSTON—	
(One bridge contract: 0.08 mile)	1,500.00
ONEIDA—	
(Two bridge contracts: 0.27 and 0.4 mile) .....3,000.00 and	4,000.00
ORANGE—	
(One contract: 3.76 miles)....	21,000.00
OSWEGO—	
(Two contracts [one bridge]: 6.61 and 0.25 miles) .20,000.00 and	2,000.00
TIOGA—	
(One bridge contract: 0.20 mile)	800.00
*ERIE—	
(One bridge contract: 0.26 mile)	3,500.00

Maps, plans, specifications, and estimates may be seen and proposal forms obtained at the office of the department in Albany, N. Y., and also at the offices of the district engineers in whose division the roads are located. The addresses of the district engineers and the counties in which they are in charge will be furnished upon request.

The especial attention of bidders is called to "General Information for Bidders" in the itemized proposal, specifications, and contract agreement.

A. W. BRANDT,
Commissioner of Highways.

Bids: July 17.

Park Road Supply Main

CONTRACT 38

West Hartford, Connecticut.

Sealed proposals addressed to the Board of Water Commissioners of the City of Hartford, Connecticut, will be received at the office of the Board in the Municipal Building until 11:00 a.m., Eastern Standard Time, Wednesday, July 17, 1929, for furnishing and laying approximately 17,000 linear feet of 42-inch pipe and 2,100 linear feet of 36-inch pipe.

Bids will be received on the following kinds of pipe:

(1) Cast iron bell and spigot pipe, made with Class D outside dimensions and either Class B or Class C thickness, cement lined inside and tar coated outside.

(2) Steel pipe with minimum plate thickness of ¼-inch, either riveted, electrically welded, or lock-bar, lined with cement to the required diameter and with outside wrapped with "Pabco" pipe covering.

(3) Reinforced concrete cylinder pipe.

(4) Standard coated A.W.W.A. cast iron bell and spigot pipe with diameters six inches larger than for cement lined pipe. (17,000 lin.ft. 48-in. and 2,100 lin.ft. 42-in.)

Plans and specifications may be obtained on or after July 1, 1929, at the office of the Manager and Chief Engineer, Pilgard Building, 1026 Main Street, Hartford, Connecticut, on deposit of Ten (10) Dollars, which will be refunded upon the return of both in good condition within four weeks after the time for opening bids.

A certified check or cashier's check for Thirty Thousand ($30,000) Dollars must accompany each bid and the successful bidder will be required to furnish bond in a sum equal to the total amount of his bid.

The right is reserved to accept any bid whether or not the lowest, or to reject any and all bids as the interest of the City of Hartford may require.

BOARD OF WATER COMMISSIONERS.
F. SPENCER GOODWIN, President.
RICHARD DILLON, Secretary.
Hartford, Connecticut.
June 19, 1929.

Bids: July 10.

Entrance Drive
Kings Park State Hospital

Kings Park, Suffolk County, N. Y.

Sealed proposals for constructing entrance drive to the Kings Park State Hospital, Kings Park, Suffolk County, N. Y., will be received at the Department of Mental Hygiene, Capitol, Albany, N. Y., at 2 p.m., Daylight Saving Time, July 10, 1929, when they will be publicly opened and read. Proposals shall be endorsed on the envelope, "Proposal for Entrance Drive, Kings Park State Hospital, Kings Park, Suffolk County, N. Y." and addressed to the Department of Mental Hygiene, Capitol, Albany, N. Y., and shall be accompanied by a deposit consisting of a certified check drawn upon some legally incorporated bank in this State and made payable at sight to the Department of Mental Hygiene, or money, equal to not less than Five per cent (5%) of the amount of the proposal. The contractor to whom award is made will be required to furnish for the faithful performance of the work a surety bond in amount of Fifty per cent (50%) of the amount of the contract. The right is reserved to reject any and all bids. Specifications and plans for this contract may be examined at the office of the Department of Mental Hygiene, Capitol, Albany, N. Y., at the office of the Chief Engineer, Division of Engineering, Department of Public Works, 353 Broadway, Albany, N. Y., at the office of the District Engineer, Department of Public Works, Pleasant Valley Road, Poughkeepsie, N. Y., at the office of the Resident Engineer, Department of Public Works, 116 West Main Street, Babylon, L. I., N. Y., at the office of the Department of Public Works, Pier 6, East River, New York City, and at the office of the Superintendent of the Kings Park State Hospital, Kings Park, Suffolk County, N. Y. Plans and specifications for this contract will be furnished by the Chief Engineer, Division of Engineering, Department of Public Works, upon payment of $2.80. The estimated cost of this project is $82,583.90.

DEPARTMENT OF MENTAL HYGIENE
F. W. PARSONS,
Commissioner.

Bids: July 10, 1929.

Construction of Concrete Substructures Filtration Plant

Detroit, Michigan.

Sealed proposals for the construction of the Substructures of the Filtration Plant at Springwells Station, located on West Warren Avenue at the Detroit Terminal Railroad, addressed to the Board of Water Commissioners of the City of Detroit, and endorsed "Proposal for Springwells Filtration Plant Substructures," will be received at the office of the Board, Water Board Building, Detroit, Michigan until 1:00 p.m., Wednesday, July 10, 1929.

The principal quantities involved are approximately as follows:

- 2,000 cu.yds. hand excavation.
- 71,100 cu.yds. reinforced concrete.
- 2,000 cu.yds. plain concrete.
- 3,000 lin.ft. cast iron drain piping. (sizes 8 in. to 36 in.)
- 23,080 lin.ft. vitrified tile underdrains. (sizes 4 in. to 12 in.)
- 850 lin.ft. vitrified tile or concrete drains. (sizes 18 in. to 36 in.)
- 60 tons miscellaneous steel and iron work.
- 50 tons sheet copper and brass.
- 12,500 tons gravel filling material.
- 2,570 lin.ft. 12-in. cast iron drain piping. (installation only)
- 1,450 tons cast iron pipe and special casting. (installation only)
- 280 flanged valves 24-in. to 36 in. (installation only)
- 91 flanged valves 8-in. to 12 in. (installation only)
- 36 sluice gates 5½ ft. x 9 ft. to 9 ft. x 12 ft. (installation only)
- 12 mud valves 24-in. (installation only)

and miscellaneous small valves, conduits, etc.

Each proposal shall be accompanied by a certified check for One Hundred Thousand Dollars ($100,000), drawn payable to the Board of Water Commissioners of the City of Detroit, as security for the acceptance of the contract.

The Board of Water Commissioners reserves the right to accept any bid or reject any or all bids, should it deem it to be to the best interests of the City of Detroit to do so.

Drawings, specifications and forms of proposal and contract may be obtained after June 19, 1929, at the office of the Board of Water Commissioners, Water Board Building, or at the Division of Engineering, 8100 West Warren Avenue, Detroit, Michigan.

THE BOARD OF WATER COMMISSIONERS
OF THE
CITY OF DETROIT
WILLIAM T. SKRZYCKI, President
LAWRENCE P. FISHER, Vice President
ALEX. DOW
FRANK P. BOOK
Commissioners.
GEORGE H. FENKELL,
General Manager and Chief Engineer
DANIEL C. GROBBEL,
Acting Secretary.

Bids: July 1.

State Highway Work

STATE OF NEW JERSEY
STATE HIGHWAY COMMISSION

Trenton, N. J.

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commission of New Jersey for:

Route No. 4, Section No 5

Construction of Route No. 4, (1927), Section No. 5, from Paterson to Arcola, in the County of Bergen. Length 2.16 miles.

Estimated:

- 30,400 cu. yds. unclassified excavation.
- 43,900 sq. yds. 9" rein. concrete pavement.
- 4,716 sq. yds. reclipped granite block pavement.
- 2,006 sq. yds. bituminous concrete, Type FA-BC-1.

Route No. 39, Sections 4, 5, & 6

Construction of Route No. 39, (1927), Sections 4, 5 and 6, South Pemberton Road to Oak Shade, in the County of Burlington. Length 6.70 miles.

Estimated:

- 68,926 cu. yds. unclassified excavation.
- 3,617 cu. yds. wet excavation.
- 7,097 cu. yds. borrow.
- 79,421 sq. yds. 9" rein. concrete pavement.

Bids for the above will be received at the office of the State Highway Commission, State House Annex, West State Street, Trenton, New Jersey, on Monday, July 1st, 1929, at twelve o'clock Noon, DAYLIGHT SAVING TIME, (eleven oclock, 11:00 A. M. Eastern Standard Time), and will be opened and read immediately thereafter.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders. Plans will be furnished on a deposit of Ten Dollars ($10.) for each set of plans and specifications upon application to the State Highway Department, Room 102, State House Annex, Trenton, New Jersey. Bids must be made on the standard proposal forms in the manner designated in the 1928 standard specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten per cent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelope will be furnished on application. Bids not enclosed in special addressed envelopes will be considered informal and will not be opened.

Each bidder must also accompany his bid with a certificate from a surety company duly authorized to do business in this State, stating sum as is required in and in accordance with the provisions of the said specifications, conditioned for the faithful performance of the provisions of the contract and specifications. Each bidder must also accompany his bid with a Statement of Equipment properly filled out.

By order of the State Highway Commission.

A. LEE GROVER,
Chief Clerk.

OFFICIAL PROPOSALS

Bids: July 8.

Bridges

STATE OF NEW JERSEY
STATE HIGHWAY COMMISSION

Trenton, N. J.

Notice is hereby given that sealed bids will be received by the State Highway Commission of New Jersey for:

BRIDGES ON ROUTE No. 29, SECTION No. 7

For the construction of five bridges on Route No. 29, Section No. 7, between Raritan and Chimney Rock. The principal items of construction are:

ESTIMATED:

3,931 cu.yds. concrete.
131,470 lbs. reinforcing steel.
191,000 lbs. structural steel.
2,726 cu.yds. excavation.

Bids for the above will be received at the office of the State Highway Commission, State House Annex, West State Street, Trenton, New Jersey, on Monday, July 8, 1929, at twelve o'clock Noon, Daylight Saving Time (eleven o'clock, 11:00 a.m. Eastern Standard Time), and will be opened and read immediately thereafter.

Drawings, specifications and form of bid, contract and bond for the proposesd work are on file in the office of the State Highway Commission, Trenton, New Jersey, and may be inspected by prospective bidders. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans and specifications upon application to the State Highway Department, Room 102, State House Annex, Trenton, New Jersey. Bids must be made on the standard proposal forms in the manner designated in the 1926 standard bridge specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten per cent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal form and special addressed envelope will be furnished on application. Bids not enclosed in special addressed envelopes will be considered informal and will not be opened.

Each bidder must also accompany his bid with a certificate from a surety company duly authorized to do business in this State, stating that such surety company will provide said bidder with a bond in such sum as is required in and in accordance with the provisions of the said specifications, conditioned for the faithful performance of the provisions of the contract and specifications. Each bidder must also accompany his bid with a Statement of Equipment properly filled out.

By order of the State Highway Commission.

A. LEE GROVER, Chief Clerk.

Bids: July 16.

Intercepting Sewer

City of Chester, Pa.

Proposal for the construction of Second Street Intercepting Sewer, Flower Street to Pumping Station. Contract No. 6—Section A.

Sealed proposals for the construction of the Second Street Intercepting sewer, Flower Street to Pumping Station, designated as Contract No. 6, Section A, said sewer beginning at a point in Second Street near Flower Street, and extending to the north end of the conduit between the Grit Chamber constructed under contract No. 2, and the Outlet Chamber of the Chester River Inverted Siphon, contract No. 11, will be received at the office of the Superintendent of Streets and Public Improvements until one o'clock p.m., Standard Time, or two o'clock p.m., Daylight Saving Time, July 16, 1929, and there deposited in a box for that purpose and then publicly opened in Council.

These bids shall be in accordance with the plans and specifications on file in the office of the City Engineer, Chester, Penna., and in the office of Robert C. Wheeler, Consulting Engineer, 36 State Street, Albany, New York. Plans and specifications may be obtained from the Superintendent of Streets and Public Improvements, Chester, Penna.

All proposals must be accompanied by a certified check made payable to the City of Chester for the amount of 5% of the bid. Bids for the construction of the Second Street Intercepting Sewer, Flower Street to Pumping Station, will be compared on the basis of the approximate quantities given on the proposal form which is attached to the specifications.

A deposit of $10.00 will be required for the specifications which will be returned after the opening of the bids by Council, and the return of the specifications and plans.

The successful bidder must furnish a surety bond subject to the approval by Council for 50% of the amount of the contract guaranteeing the proper completion of the work.

The contractor upon bidding shall name a Surety company authorized to do business in the State of Pennsylvania for the surety bond or the bid will be considered informal and shall submit therewith the financial statement of the said Company.

The Surety company named must be a surety company that has been properly registered with the City Clerk of the City of Chester. As to the requirements of this registration, the prospective bidder or bidders may receive such information from the office of the City Clerk.

A copy of the advertisement must accompany the proposal. If the advertisement does not accompany the proposal, the bid will be considered informal. Council reserves the right to reject any and all bids.

The proposal sheet required a bid for 76 items, of which the following are the most substantial.

Approximately	290	lin.ft. 8-inch Vit. Pipe Sewer
Approximately	730	lin.ft. 10-inch Vit. Pipe Sewer
Approximately	85	lin.ft. 12-inch Vit. Pipe Sewer.
Approximately	1,725	lin.ft. 20-inch Vit. Pipe Sewer
Approximately	1,510	lin.ft. 27-inch Precast reinforced concrete pipe
Approximately	1,515	lin.ft. 30-inch Precast reinforced concrete pipe
Approximately	555	lin.ft. 36-inch Precast reinforced concrete pipe
Approximately	85	lin.ft. 10-inch Cast Iron Pipe Sewer
Approximately	45	lin.ft. 30-inch Cast Iron Pipe Sewer
Approximately	28	Manholes
Approximately	3,350	cu.yds. rock excavation

Miscellaneous items, such as regulator and tide gate chambers, railroad crossings, street railway crossings, repaving, resurfacing, etc.

G. J. HUNTER, Superintendent,
Streets and Public Improvements.
BENJ. NEWSOME,
City Clerk.

Bids: July 17.

Refrigeration Work

SPEC. NO. 5377

Marcy, N. Y.

Sealed proposals covering Refrigeration Work—Bakery, Utica State Hospital, Marcy Division, Marcy, N. Y., in accordance with Specification No. 5377 and accompanying drawings, will be received by the Commissioner, Department of Mental Hygiene, Capitol, Albany, N. Y., until 2 o'clock p.m. (Eastern Standard Time) on Wednesday, July 17, 1929. Proposals shall be accompanied by a certified check or money deposit of 5% of the amount of the bid. Successful bidder will be required to give a bond in the sum of 50% of the amount of the contract. Drawings and specifications may be examined free of charge at the following offices:

Commissioner of Architecture, 949 Broadway, New York City.
Commissioner of Architecture, 353 Broadway, Albany, N. Y.
District Engineer, 109 N. Genesee St., Utica, N. Y.
District Engineer, Weighlock Building, Syracuse, N. Y.
District Engineer, Barge Canal Terminal, Rochester, N. Y.
District Engineer, Barge Canal Terminal, Buffalo, N. Y.
District Engineer, 71 Frederick St., Binghamton, N. Y.
Utica State Hospital, Marcy Division, Marcy, N. Y.

Proposal blanks and envelopes may be obtained and drawings and specifications may be purchased by general or subcontractors from the Commissioner of Architecture, 353 Broadway, Albany, N. Y., upon a payment of $3.00.

There will be no return of the money paid for such drawings and specifications.

DATED: June 6, 1929.

Bids: July 8.

State Highway Work

STATE OF NEW JERSEY
STATE HIGHWAY COMMISSION

Trenton, N. J.

Notice is hereby given that sealed bids will be received by the State Highway Commission of New Jersey for:

ROUTE No. 29, SECTION No. 8

Construction of Route No. 29, Section No. 8, Chimney Rock to Washington Avenue, in the County of Somerset.

Length 4.568 mi.

ESTIMATED:

86,328 cu.yds. unclassified excavation.
81,542 sq.yds. 9-inch reinforced concrete pavement.
68,117 sq.yds. improved shoulders.

Bids for the above will be received at the office of the State Highway Commission, State House Annex, West State Street, Trenton, New Jersey, on Monday, July 8, 1929, at twelve o'clock Noon, Daylight Saving Time (eleven o'clock, 11:00 a.m. Eastern Standard Time), and will be opened and read immediately thereafter.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans and specifications upon application to the State Highway Department, Room 102, State House Annex, Trenton, New Jersey. Bids must be made on the standard proposal forms in the manner designated in the 1928 standard specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten per cent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelope will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened.

Each bidder must also accompany his bid with a certificate from a surety company duly authorized to do business in this State, stating that such surety company will provide said bidder with a bond in such sum as is required in and in accordance with the provisions of the said specifications, conditioned for the faithful performance of the provisions of the contract and specifications. Each bidder must also accompany his bid with a Statement of Equipment properly filled out.

By order of the State Highway Commission.

A. LEE GROVER,
Chief Clerk.

Bids: July 16.

Ware River Intake Works

COMMONWEALTH OF MASSACHUSETTS
METROPOLITAN DISTRICT WATER SUPPLY COMMISSION

Boston, Mass.

Sealed proposals will be received at the office of the Metropolitan District Water Supply Commission, 24 School Street, Boston, Massachusetts, until 2:00 p.m. (daylight saving time), Tuesday, July 16, 1929, for the construction of the diversion dam and the intake substructure at Shaft 8 of the Wachusett-Coldbrook Tunnel in the town of Barre, Massachusetts. The spillway portion of the dam will be a low arch dam with granite facing. The intake will contain siphon spillways formed in the concrete. The work must the completed before March 1, 1931. Each bid must be accompanied by a certified check for $5,000.00. A bond or other approved security in such amount not to exceed 50 per cent of the amount of the contract as the Commission may determine after the bids are opened will be required. Plans, information, forms of proposal, contract and specifications, may be obtained from Frank E. Winsor, Chief Engineer of the Commission. The Commission reserves the right to reject any or all bids or to accept the proposal or proposals deemed best for the Commonwealth.

R. NELSON MOLT, Secretary.

OFFICIAL PROPOSALS

Bids: July 2.

Heating & Electric Work

SPEC. NOS. 5592 and 5408

Poughkeepsie, N. Y.

Separate sealed proposals covering Heating and Electric Work, Service Connections, Nurses Home, Infirmary and Staff Apartments, Hudson River State Hospital, Poughkeepsie, N. Y., in accordance with Specifications Nos. 5592 and 5408 and accompanying drawings, will be received by the Commissioner, Department of Mental Hygiene, Capitol, Albany, N. Y., until 2:00 o'clock p.m. (Eastern Standard Time) on Tuesday, July 2, 1929. Proposals shall be accompanied by a certified check or money deposit of 5% of the amount of the bid. Successful bidders will be required to give a bond in the sum of 50% of the amount of the contract. Drawings and specifications may be examined free of charge at the following offices:

Commissioner of Architecture, 949 Broadway, New York City.

Commissioner of Architecture, 353 Broadway, Albany, N. Y.

District Engineer, 109 N. Genesee St., Utica, N. Y.

District Engineer, Weighlock Building, Syracuse, N. Y.

District Engineer, Barge Canal Terminal, Rochester, N. Y.

District Engineer, Barge Canal Terminal, Buffalo, N. Y.

District Engineer, 71 Frederick St., Binghamton, N. Y.

Hudson River State Hospital, Poughkeepsie, N. Y.

Proposal blanks and envelopes may be obtained and drawings and specifications may be purchased by general or subcontractors from the Commissioner of Architecture, 353 Broadway, Albany, N. Y., upon a payment of $3.00.

There will be no return of the money paid for such drawings and specifications.

DATED: June 1, 1929.

OFFICIAL PROPOSALS

Bids: July 12.

Foundations and Building for Garbage Furnace and Additions to Sewage Disposal Plant

Greenville, Pa.

Sealed proposals for the construction of foundations and building for garbage furnace and additions to sewage disposal plant will be received by the Borough Secretary of Greenville, Pa., until 7:00 p.m. on the 12th day of July at the office of the Borough Secretary.

The work consists of constructing completely the foundations and superstructure for a garbage incinerating plant and the construction of an additional Imhoff tank, covered sludge bed, mechanically operated coarse screen, sewage pumping station and relief works.

Official proposal blanks, instructions to bidders, specifications, form of contract and bond may be seen at the office of the Borough Secretary, Greenville, Pa., or one copy of plans and two copies of specifications may be obtained by bona fide bidders upon application to the J. N. Chester Engineers, 813 Clark Building, Pittsburgh, Pa., or to the Borough Secretary, Greenville, Pa., on deposit of twenty-five ($25.00) dollars, which amount will be refunded to bidders on receipt of bona fide bid. Five ($5.00) dollars will be deducted from the deposit of those who do not submit a bid but return both plans and specifications in good order within thirty (30) days after date of receipt of bids. Extra copies of plans and specifications will cost five ($5.00) dollars, but likewise must be returned. The right is reserved to reject any or all bids.

J. M. HITTLE,
Borough Secretary.

THE J. N. CHESTER ENGINEERS,
813 Clark Building,
Pittsburgh, Pa.

OFFICIAL PROPOSALS

Bids: July 16

Swartswood Myrtle Grove Road

Sussex, N. J.

Notice is hereby given that sealed bids will be received by The Board of Chosen Freeholders of the County of Sussex for the construction of Swartswood Myrtle Grove Road in the Township of Hampton in the County of Sussex with a gravel surface upon an earth foundation, estimated amount of gravel surface pavement required is 13,400 square yards, of excavation 3,803 cu. yards, and opened and read in public at the Freeholders Office, Newton, N. J., on July 16th at 11:30 A. M. Daylight Saving Time.

Drawings, specifications and forms of bids, contracts and bond for the proposed work, prepared by Harvey Snook, County Engineer, and approved by the State Highway Commission, have been filed in the office of the said Engineer at Newton, N. J., and of said State Highway Commission, Trenton, N. J., and may be inspected by prospective bidders during business hours. Bidders will be furnished with a copy of the specifications and blue prints of the drawings by the Engineer on proper notice and payments of cost of preparation. Bids must be made on the standard proposal forms in the manner designated therein and required by the specifications, must be enclosed in sealed envelopes, bearing the name and address of bidder and name of road on outside, addressed to the Board of Chosen Freeholders, Newton, N. J, and must be accompanied by a Certificate of a Bonding Company and a certified check for not less than ten (10) per cent of the amount bid, provided said check shall not be less than $500 nor more than $20,000 and be delivered at the place and on the hour above named. The standard proposal form is attached to the specifications, copies of which will be furnished on application to Engineer.

BY ORDER OF THE COUNTY OF SUSSEX

(Signed) Norman B. Anderson Clerk.

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PA-20

U. S. Government

PROPOSALS FOR CONSTRUCTION OF SPILLWAY: U. S. Engineer Office, Foot of Prytania Street, New Orleans, La.—Sealed proposals will be received here until 11 a.m., July 8, 1929, and then opened for constructing the Bonnet Carre Spillway Structure. The work includes approximately 400,000 cubic yards of excavation; 135,000 cubic yards concrete; 750,000 lineal feet piling; 128,000 tons rip-rap; 70,000 tons gravel or spalls; 600,000 square feet steel sheet piling; structural and reinforcing steel, and other items. The spillway site is located on the left bank of the Mississippi River, 30 miles upstream from New Orleans, La. Plans and specifications may be obtained upon application and deposit of certified check for $5.00, payable to Disbursing Officer, New Orleans River District, for their safe return. (242)

U. S. ENGINEER OFFICE, 428 Customhouse St., St. Louis, Mo.—Sealed bids will be received here until 11 a.m., July 10, 1929, and then opened, for furnishing all labor and materials and performing all work for placing about 135,000 cubic yards of earthwork in new levee construction in the South Beardstown Drainage and Levee District, Illinois. Further information on application. (243)

This Advertising Costs Little

The cost of giving contracts NATIONAL publicity through the Official Proposal Columns of *Engineering News-Record* is only 40 cents a line an insertion. Figured on a circulation basis, the cost per line per thousand readers (1⅓ cents) is extremely small, compared with the cost of other forms of publicity and the possibility of large waste distribution through publications of limited or general circulations. A single lower bid may save the cost of the advertising many times over.

U. S. Government

UNITED STATES DEPARTMENT OF AGRICULTURE, Washington, D. C., June 15, 1929.—Sealed bids will be received until 2:00 o'clock p.m. Eastern Standard Time, on the 26th day of July, 1929, and then publicly opened, for furnishing all labor and materials and performing all work for constructing certain river control works, dikes, canals, and appurtenant structures for Bear River Migratory Bird Refuge, in Box Elder County, Utah. The work will be let under two contracts, the first covering the construction of river control works and all appurtenant structures, and the second covering the construction of earth dikes and canals and spillways. The principal items of the work are approximately as follows: Schedule No. 1: Wet excavation 3,600 cubic yards; round timber piles, 1,050 linear feet; lumber, 65,000 feet, B.M.; rockfill, 275 cubic yards; concrete, 975 cubic yards; reinforcing steel, 66,375 pounds; steel radial gates with hoists—12 gates, 6 feet by 16 feet; 2 gates, 3 feet by 16 feet. Schedule No. 2: About 13½ miles earth dikes 2½ to 6 feet high, excavation, 7,500 cubic yards; embankment, 511,000 cubic yards; lumber (42 structures) 440,000 feet B.M.; canal excavation, 37,000 cubic yards. Persons or companies desiring to bid must submit with their bids attested statements, on forms to be supplied by the contracting officer, of their financial resources and construction experience. Award of contracts will be made only to contractors who can show sufficient experience and financial resources to insure the satisfactory construction of the work contemplated. Where copies of plans are requested, a deposit of $10.00 will be required to insure their return. If these are not returned within 15 days after bids are opened, the deposit will be forfeited to the government. Checks should be certified and made payable to A. Zappone, Disbursing Agent, U. S. Department of Agriculture. For copies of Standard Forms, plans and specifications, address Chief, Division of Purchase, Sales and Traffic, U. S. Department of Agriculture, Washington, D. C.; or L. M. Winsor, Project Engineer, Brigham City, Utah, who will furnish detailed information regarding local conditions. (251)

U. S. ENGINEER OFFICE, 428 Customhouse, St. Louis, Mo.—Sealed bids will be received here until 11 a.m., July 10, 1929, and then opened, for furnishing all labor and materials and performing all work for constructing 7,000 linear feet of bank revetment in the Mississippi River at Scudder Towhead, Ill. Further information on application. (264)

U. S. Government

WAR DEPARTMENT, United States Engineer Office, Galveston, Texas.—Sealed proposals will be received here until 2:30 p.m., July 15, 1925, and then opened, for furnishing and delivering two steel barges. Further information on application. (263)

OFFICE CONSTRUCTING QUARTERMASTER, March Field, Riverside, California, June 20, 1929.—Sealed proposals in triplicate will be received here until 10 o'clock a.m., July 22, 1929, for construction and installation of the street lighting system, and 11 o'clock same date for construction of twenty-five sets of non-commissioned officers' quarters. Copies of plans and specifications may be had on application from constructing quartermaster, March Field, Riverside, California. $25.00 deposit on each set of plans will be required for return. Plans and specifications may also be seen in the office Constructing Quartermaster, Fort Mason, California. (266)

WAR DEPARTMENT, Office of the Constructing Quartermaster, San Juan, Porto Rico.—Sealed proposals will be received at this office until 11.00 a.m. Standard Time, and in the Office of the Constructing Quartermaster, 39 Whitehall Street, New York City, until 10.00 a.m. Eastern Standard Time, on August 6, 1929, and then opened at both offices, for the construction of one (1) Hospital Building, eight (8) Company Officers' Quarters, five (5) Non-Commissioned Officers' Quarters, and one (1) Infantry Barracks, at Henry Barracks, Porto Rico. Plans and specifications may be obtained from the Office of the Constructing Quartermaster, San Juan, P. R., and the Office of the Constructing Quartermaster, 39 Whitehall Street, New York City, for a deposit of $25.00. (265)

OFFICE OF CONSTRUCTING QUARTERMASTER, Fort Monmouth, N. J.—Sealed proposals will be received here until 12:00 Noon Eastern Standard Time, July 24, 1929, and then opened for furnishing all labor, equipment, material and performing all work for the construction of 5 four-family apartments and a Bachelor Officers' Quarters Building. Plans and specifications will be furnished upon receipt of certified check for $25.00. Plans may be seen here and at the office of the Constructing Quartermaster, 39 Whitehall St., New York City. (267)

U. S. ENGINEER office, Wilmington, N. C.—Sealed bids, in duplicate, will be received until 12 o'clock noon, July 25, 1929, and then publicly opened for furnishing all labor and materials and for the construction of a highway bridges across the Intracoastal Waterway from Beaufort to Cape Fear River, N. C. Information on application. (261)

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., June 18, 1929.—Sealed bids will be opened in this office at 3 p.m., July 22, 1929, for extension and remodeling (except elevator) of the U. S. post office at Watertown, N. Y. Drawings and specifications, not exceeding six sets, may be obtained at this office in the discretion of the supervising architect by any satisfactory general contractor, and provided a deposit is made of $25.00 for each set to assure its prompt return. Checks offered as deposits must be made payable to the order of the Treasurer of the United States. JAS. A. WETMORE, Acting Supervising Architect. (262)

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POSITIONS VACANT

ASSISTANT superintendent for railway grading and construction with prospect. Man familiar handling of men. Total abstainer, 30-40 preferred. P-238, Engineering News Record, Tenth Ave. at 36th Street, New York.

CHECKERS and detailers wanted for mill and office buildings. Good opportunity for experienced and competent men. Give age, education, experience, salary expected and how soon available. Union Structural, Inc., 1407 Erie Boulevard East, Syracuse, N. Y.

DESIGNERS wanted—Experienced in design of concrete and steel highway bridges. Give full information in letter of application. J. S. Watkins, State Highway Engineer, Frankfort, Ky.

DESIGNER, draftsman on preparation of drainage and grading plans in connection with airport development. Permanent position with excellent future for men with right qualifications. State age, education, previous experience and salary expected in first letter. P-251, Engineering News-Record, Tenth Ave. at 36th Street, New York.

DRAFTSMEN—Two or three men with a couple of years' experience on structural steel and ornamental iron wanted by concern specializing in fabrication by electric welding. Give experience and state salary. Manchester Engineering & Welding Co., Inc., Manchester, N. H.

DRAFTSMAN, familiar with manufacturing plant construction, equipment and power. Prefer a man with tannery experience. Give age, experience and salary. Engineering Department, Elk Tanning Co., Ridgway, Pa.

DRAFTSMAN and estimator: Bar experience. Apply by letter, giving full information on experience, age and salary desired. Location, Philadelphia. P-252, Engineering News-Record, Tenth Ave. at 36th Street, New York.

ENGINEER draftsman wanted—experienced in the design of structures and equipment layout for paper and pulp mills. State age, education, experience, married or single, salary required and references in first letter. Position is permanent. P-198, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

ENGINEER wanted with knowledge of paper and pulp mill process. Must be of the executive type with ability to handle the development and planning of an entire project. This position can be filled by either a chemical, mechanical, or civil engineer and will be permanent. A man with ability to visualize and plan the process in terms of equipment, machinery, and buildings, is required. We can offer exceptional opportunities to the engineer with the right personality, ability, and experience. P-200, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

ENGINEER to estimate and design reinforced concrete wanted. With knowledge of bar construction. Bar company experience desirable. In reply give education, experience, age and salary expected. Location Philadelphia, Penna. P-204, Engineering News-Record, Tenth Ave. at 36th St., New York.

GRADUATE C. E. wanted, who is a good draftsman and is willing to pay his way by drafting while he is learning structural design. Elwyn E. Seelye, 101 Park Avenue, N. Y. C.

JUNIOR mine engineers (single), for work in large copper mine, Chile, South America; 3 years contract, transportation both ways and salary while traveling paid by company. In replying give complete details. P-212, Engineering News-Record, 10th Ave. at 36th Street, New York.

MECHANICAL engineer draftsman wanted—thoroughly experienced in the development and design of automatic machinery. Must be engineering graduate with ingenuity and vision. State age, education, experience, married or single, salary required and references in first letter. Position is permanent. P-199, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

OPERATORS wanted, for steam shovels and drag lines. Reply giving age and machines you have operated. P-232, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

PENNSYLVANIA fabricator wants competent man in Detroit, Michigan, who can estimate and sell structural steel. In reply tell your complete story. P-237, Engineering News-Record, Tenth Ave. at 36th Street, New York.

RECENT college graduate wanted for structural detailing and designing with an American engineering company in the Far East. 3-year contract. State experience and general reference. P-243, Engineering News-Record, Tenth Ave. at 36th St., New York.

STRUCTURAL steel detailers and checkers wanted, with 3 to 4 years' experience with commercial fabricators. Give full information as to age, training, previous experience, nationality, salary desired, and earliest date to report in the first letter. Address Mr. Molsberry, Chief Draftsman, Standard Building Department, Truscon Steel Company Youngstown, Ohio.

Structural Checkers and Detailers

thoroughly experienced in making shop drawings

Reply, stating age, salary, experience to

J. J. DUNKEL

WHITEHEAD AND KALES CO.
2361 Beecher Avenue, Detroit, Mich.

Mechanical Engineer for Development Work

Milwaukee metal-working factory—responsible, well-established and with ample capital—is about to start a department for developing new products, principally of pressed metal, in automotive and other fields. We wish to connect with a man having technical training and practical experience to take charge of department. Some electrical and radio knowledge desirable. Good opportunity for the right man who is looking to the future. Replies confidential. Write fully to

P-170, Engineering News-Record
520 North Michigan Ave., Chicago, Ill.

Sales Engineer

A prominent builder of shovels and cranes is interested in securing a Sales Engineer who knows how to sell this or similar equipment. He must be of the highest type, a hard worker and demonstrate his ability to produce.

Submit full information, past history and compensation desired in first letter.

P-194 Engineering News-Record,
520 N. Michigan Ave., Chicago, Ill.

GRADUATE ENGINEER

to take charge of construction in industrial plant in the South. State age, experience, and salary expected. Address

P-223, Engineering News-Record,
Tenth Ave. at 36th St., New York City

To Qualify for Higher Salary

The quality of your work must improve proportionately. Specialized training in up-to-date, practical engineering methods will bring you broader opportunities in an ever-growing engineering field which will never be over-crowded with competent men. The opportunity to get out of the rut, is offered by enrollment in the

WILSON COURSE IN STRUCTURAL ENGINEERING
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Our Preparatory Course provides the necessary foundation for our other advanced engineering courses, for men with no previous technical training. Practically 85% of our students are practicing engineers—former graduates of technical colleges,—with a back-ground of some years' experience in general engineering work.

18th YEAR **Wilson Engineering Corporation**
College House Offices, Harvard Square, Cambridge, Mass.

POSITIONS VACANT

WANTED—A man familiar with construction activities in the East to promote reinforced concrete building construction. Must be capable in the design of reinforced concrete structures and must be experienced in the handling of all construction details thereof. P-214, Engineering News-Record, Tenth Ave. at 36th St., New York.

WANTED—experienced concrete pavement inspectors, salary $150 to $200. Give experience with first reply. Louisiana Highway Commission, Harry B. Henderlite, Office Manager, Baton Rouge, La.

WANTED—Graduate civil or mechanical engineer experienced in oil refinery layout and design. State age, experience and salary desired in first letter. P-210, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

NOTICE

POSITION of assistant to chief engineer, advertised June 6, has been filled. A. M. Reynolds, 37 Cambridge Road, Montclair, N. J.

EMPLOYMENT SERVICE

IF you are qualified for position between $2,500 and $25,000 and are receptive to negotiations for new connection, your response to this announcement is invited. The undersigned provides a thoroughly organized service, established nineteen years ago, to conduct confidential preliminaries, and assist the qualified man in locating the particular position he desires. Not a registration bureau. Retaining fee protected by refund provision, as stipulated in our agreement. Send name and address only for description of service. R. W. Bixby, Inc., 272 Main Street, Buffalo, New York.

$3,000.00-$30,000.00 men find our service effective in making connections. Individual. Confidential. Refund agreement. Not agency. Jacob Penn, Incorporated, 9 Park Place, New York.

EMPLOYMENT AGENCIES

AMERICAN Engineers Service, Emich Bldg., Pittsburgh, require chief draftsmen, designers, checkers, estimators and draftsmen of every description to be offered employers at advanced salary rate, New York, Philadelphia, Pittsburgh, Cincinnati, Cleveland, Detroit, Chicago and intermediate cities.

42 ENGINEERS and draftsmen immediately; irrigation engineers, $200-$300; irrigation designers, $250-$300; highway and irrigation engineers, Latin America, $200-$250; highway draftsmen, plan designers, $175-$200; highway instrumentmen and draftsmen, $135-$175; railroad draftsmen, $200; valuation computers, $185-$200; draftsmen, detailers, checkers, designers, structural fabrication, mechanical and electrical lines, East and West U. S., $175-$350. Write or wire today. Interstate, Security Bldg., Denver, Colo.

WANTED: Engineers, designers, draftsmen on machinery, steel and concrete, automotive and steel plant work, also recent engineering graduates. Cleveland Engineering Agency, Rose Building, Cleveland, Ohio.

TECHNICAL SERVICE AGENCY
217 Broadway, New York, N. Y.
Specialists in
TECHNICAL PERSONNEL

EMPLOYMENT AGENCIES

WANTED immediately: Several bridge designers, $190 to $250; topographical draftsman, Tropics, $150-$175; structural detailer, highway structures, $175; assistant engineer, Central America, $175; highway plan designer, $175; oil refinery draftsman, $150; railroad map draftsman, West, $190. Apply Business Men's Clearing House, Denver, Colorado.

POSITIONS WANTED

Civil Engineers

CIVIL engineer, C.E. Married. Desires permanent position with a reputable company. Capable of supervising both field and office, can furnish best of reference, at present employed. Available July 1. PW-207, Engineering News-Record, Tenth Ave. at 36th Street, New York.

GRADUATE civil engineer, single, desires position as assistant resident engineer or assistant construction superintendent; few years' experience, teaching, general survey work and as an engineer in construction office on large industrial job; available immediately; references. PW-218, Engineering News-Record, Tenth Ave. at 36th St., New York.

CIVIL engineer, Purdue graduate, age 25, desires work with a future, any branch, any location, but prefer hydraulic and sanitary work. Experience in construction, instrument work, minor design, and drafting. PW-236, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

CIVIL engineer, graduate, married, age 33. Exceptional structural engineering experience. At present in charge of design and detail over 25 men. Field and office experience. Desires a position offering more of a future. PW-230, News-Record, 520 No. Michigan Ave., Chicago, Ill.

AN A-1 graduate civil engineer; construction superintendent, age 36, married, fifteen years executive, in full charge of office, bank, and school buildings. Employed but desires new connection. PW-242, Engineering News-Record, Guardian Bldg., Cleveland, Ohio.

Draftsmen & Designers

SUPER map draftsman and surveyor combined, thoroughly efficient in either field and office work, technically educated, 21 years of undivided experience, 40 years old, wants steady position in large city in the Southwest. Earns $200 a month. Write to V. P. Gamboa—Route 1, Box 369, Hammond, Indiana.

DRAFTSMAN and engineer, twelve years' experience, structural steel detailing and checking, desires position as chief draftsman in small concern. Have available for such, a system of commercial detailing, result of three years' careful study in fabricating shops. College training. Available immediately. Prefer Ohio location. PW-241, Engineering News-Record, Guardian Bldg., Cleveland, Ohio.

Civil Engineer and Construction Superintendent
Assoc. Member A.S.C.E.
Eighteen years experience Latin America. Location, construction, valuation, maintenance, railroads. Best of references. Will also consider sales or advertisement, railroad or construction materials in those countries.
PW-245, Engineering News-Record
Tenth Ave. at 36th St., New York City.

Engineering Associate
Experienced in Water Works and Sewage Disposal designing to assume responibility of office located in Illinois.
PW-192, Engineering News-Record
520 N. Michigan Ave., Chicago, Ill.

POSITIONS WANTED

Bridge and Structural

STRUCTURAL engineer with 20 years' experience as checker—squad leader and designer wishes to make a change. PW-219, Engineering News-Record, Tenth Ave. at 36th St., New York.

STRUCTURAL engineer; 25 years' experience structural steel and reinforced-concrete design and supervision; technical graduate; now in charge of engineering office. PW-65, Engineering News-Record, Tenth Ave. at 36th St., New York.

STRUCTURAL engineer, with 20 years' experience on design and construction of steel and concrete bridges and buildings, desires a Southern engagement. Chicago, New York and Southern references. PW-227, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

STRUCTURAL and hydraulic engineer, twenty years' experience, open for engagement. Water power a specialty. PW-231, Engineering News-Record, 10th Ave. at 36th St., New York.

Surveyors

PROFESSIONAL engineer and land surveyor New York. Nine years design, construction and mechanical equipment of factory buildings and industrial plant development. Seeks executive position along these lines where ability will be recognized. PW-141, Engineering News-Record, Tenth Ave. at 36th St., New York.

YOUNG man, I.C.S. student in civil engineering, wants position as chainman or rodman; some experience. PW-240, Engineering News-Record, Tenth Ave. at 36th St., New York.

SURVEYOR, civil engineer graduate; 12 years' experience, municipal, highway, hydrographic, land and topographic surveying. Surveyor, 165 Locust St., Chicago, Ill.

Estimators

HIGH grade building estimator. Fifteen years' experience all types buildings. Can estimate all general trades. PW-70, Engineering News-Record, Tenth Ave. at 36th St., New York.

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Technically trained Executive, American, living in Paris since September, 1923, and desirous of locating permanently somewhere in Europe, would like to hear from responsible concerns that may have an opening over here for successful administrator, experienced in Engineering, Sales Production, Promotion and Finance. Special commissions also undertaken and concluded. Willing to make a trip to the States if proposition warranted. Address
PW-257, Engineering News-Record
Tenth Ave. at 36th St., New York City

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POSITIONS WANTED

Superintendents

ASSISTANT superintendent or general foreman with 25 years' experience in tunnels, shaft-sinking, subways, foundations, timbering of all kinds, and open cut work. P. O. Box 326, Oakdale, Mass.

CONSTRUCTION superintendent, 25 years' successful achievement on works of magnitude, compressed air work, deep and difficult foundations, heavy shoring, steel and timber coffer dams, and caissons, round timber, steel and concrete pile driving, hard and soft ground tunnels, grade crossing eliminations, harbor improvements, water purification and sewage disposal plants, subways, concrete arch bridges, heavy and difficult underpinning, high-pressure steel and concrete pipe lines, hydro-electric plants. Salary $400 per month. Available immediately. Location immaterial. PW-163, Engineering News-Record, Tenth Ave. at 36th Street, New York.

CNSTRUCTION superintendent, able executive; 20 years' practical experience, concrete arch bridges, difficult foundations, river work, heavy shoring, underpinning, cofferdams, caissons, pile driving, tunnels, grading, sewage treatment plants. Salary $350. Go anywhere. PW-164, Engineering News-Record, 1600 Arch Street, Philadelphia, Pa.

CONSTRUCTION superintendent, twenty years' experience on industrial and commercial buildings. First-class organizer; age 45; will go anywhere. PW-235, Engineering News-Record, Tenth Ave. at 36th St., New York.

CONSTRUCTION superintendent and engineer, 16 years' expereince supervision, design and survey of buildings, municipal improvements, large industrial plants, railroads and bridges. Able executive; ability to design, specify and carry out project from inception to completion. $400.00 per month. PW-229, Engineering News-Record, Guardian Bldg., Cleveland, Ohio.

CONSTRUCTION superintendent, long practical experience reinforced concrete construction, industrial plants, cold storage concrete, dry docks. All types of buildings. Location immaterial. PW-250, Engineering News-Record, Tenth Ave. at 36th Street, New York.

CONSTRUCTION superintendent available, any location. Mature experience, high-class buildings. An organizer, can analyze your troubles, stabilize costs and assure you action. Salary approximately, $6,000. PW-246, Engineering News-Record, Tenth Ave. at 6th St., New York.

DREDGE manager - superintendent, eighteen years' responsible charge large dredging projects: river, harbor and canal excavations; deep waterways, ship channels, fills rock removal, land reclamation; drainage; highest reference PW-879, Engineering News-Record, Tenth Ave at 36th St., New York.

ERECTION superintendent thoroughly qualified from years' of experience in the erection of all types of steel structures. Age 35, well educated, energetic, capable hard worker. Can handle derricks and erection gangs; have erected office buildings, large theatres, viaducts, railroad bridges, churches, schools, mill building, refineries and smelters. PW-100, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

GENERAL superintendent or manager: Twenty years' experience on all classes of building construction. For the past five years have had charge of over eight millions of dollars worth of work a year. Employed but wish to make change, available on months notice. Minimum salary $10,000 per year. PW-176, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

SUPERINTENDENT, 18 years on state road construction of all kinds; also city work, sewers, water and rock excavation. Have built many miles of state road in Jersey. Can furnish best of reference. Location anywhere. PW-233, Engineering News-Record, Tenth Ave. at 36th Street, New York.

SUPERINTENDENT, sewers, water lines, filtration, disposal plants, difficult foundations, heavy excavations, rock or earth, earth or concrete dams. Fifteen years' experience handling entire field organizations. Available immediately, location immaterial. PW-864, Engineering News-Record, Tenth Ave. at 36th St., New York.

WORKS manager or superintendent—High production, low costs and good organizer. My reputation can put pep into your organization. PW-152, Engineering News-Record, Tenth Ave. at 36th St. New York.

SUPERINTENDENT-Estimator—graduate engineer experienced on factory type and finished buildings. Available July 1. Age 35. Married. Salary $300 per month. PW-208, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

SUPERINTENDENT engineer, 20 years' successful experience in responsible charge of entire field organization on sewer, paving, water and treatment plants. PW-188, Engineering News-Record, 520 North Michigan Ave., Chicago, Ill.

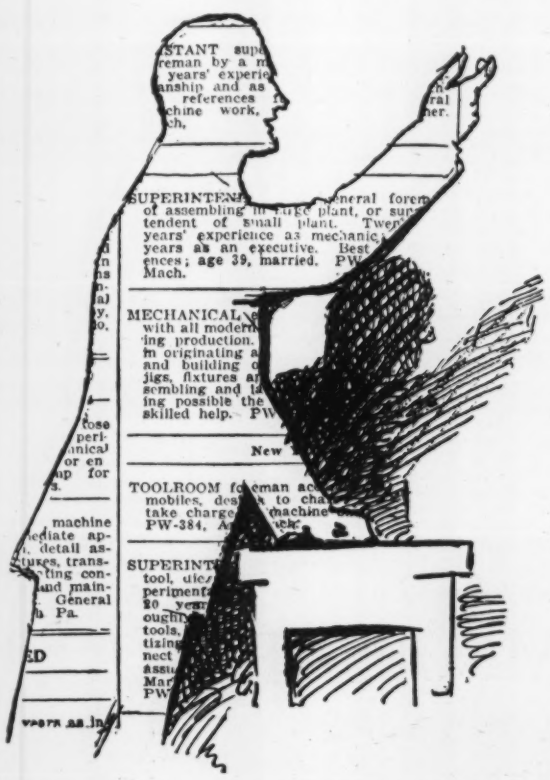
SUPERINTENDENT, served construction, age 39, wants position, permanent nature. Experienced deep trenching, heavy timbering, syphons, concrete work, estimating. Available now. Salary, $350. PW-255, Engineering News-Record, Tenth Ave. at 36th St., New York.

Miscellaneous

AN ENGINEER, 29 years old, single, 8 years' experience in field and office, good draftsman, estimator and field engineer with executive ability. Available July 1; on present connection 2½ years. Excellent reference and technical training. Write or wire. H. Marshall Wise, 114 W. 33rd St., Norfolk, Va.

CHIEF of party, locating engineer or assistant to engineer of large construction project—single, 31, university trained, nine years' varied experience in United States and Latin America, including trans-Andean highway location and railway construction, precise surveys for subway and bridge construction, municipal improvements and pioneer surveys of geographic extent. Competent and accustomed to push work under difficulties prevailing in undeveloped countries. American, speak and write Spanish, some knowledge of French and German. Will go anywhere. Employed at present, but available on short notice. References. New York interview. PW-254, Engineering News-Record, Tenth Ave. at 36th Street, New York.

CONSTRUCTION man over twenty years' actual experience wants connection with large responsible construction company, preferably as superintendent of construction. Address P. O. Box 153, Upper Darby, Pa.



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Notice To Advertisers!

Owing to the Fourth of July, the *"Searchlight"* pages of the July 4 issue of

ENGINEERING NEWS-RECORD

will close one day in advance of the regular schedule.

Advertisers will be cooperating with us by sending new advertisements or changes of copy early.

FINAL CLOSING TIME
10 A.M. Monday, July 1st.

(Proposals advertising will be accepted until 10 A.M. Tuesday, July 2.)

POSITIONS WANTED

CONSTRUCTION engineer (graduate civil engineer, age 28), six years' varied experience in construction work, three years with national contractor and now having responsible charge as engineer of construction work, wishes to invest $5,000 and services in an active and progressive construction firm. Capable as assistant superintendent of large work or superintendent of smaller jobs and thoroughly competent in contracting office work. PW-228, Engineering News-Record, Tenth Ave. at 36th St., New York.

CONSTRUCTION manager or general superintendent; twenty years' experience; have handled more than twelve million dollars worth of work as executive; age 45; minimum salary $8,000 per year. PW-234, Engineering News-Record, Tenth Ave. at 36th St., New York.

CONSTRUCTION executive, qualified as general manager, chief estimator or chief draftsman. Fifteen years' experience. Can purchase, handle sub-contracts, supervise, analyze costs, etc. PW-249, Engineering News-Record, Tenth Ave. at 36th Street, New York.

CONSTRUCTION and designing engineer (technical), six years with steel fabricators, 18 years railroads on construction, maintenance, design, inspection, investigations; bridges, buildings, railway structures; superstructures, foundations; timber, steel, concrete. Now bridge engineer of small railroad doing all work with my own forces. PW-248, Engineering News-Record, Tenth Ave. at 36th Street, New York.

ENGINEER desires to make change. Twenty years' experience in construction, specifications and office management. Thorough knowledge of construction material. Capable of assuming charge of office. PW-247, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

EXPERT reinforced concrete engineer; technical C.E. graduate; 16 years' experience; licensed. Sinc 1919 with nationally known company manufacturing fireproof building products. Experienced executive; desires change where reinforced concrete and executive engineering may be better utilized. Present salary about $4,000. PW-244, Engineering News-Record, Tenth Ave. at 36th St., New York.

ENGINEER—superintendent—estimator, broad experience, building, railroad and other construction, open for engagement July 1st, in eastern Penn. or New York City. PW-216, Engineering News-Record, Tenth Ave. at 36th St., New York.

EXECUTIVE desires connection with construction organization. Well qualified in business administration. Unassailable record. Any proposal with promise of future considered. PW-173, Engineering News-Record, Tenth Ave. at 36th Street, New York.

GENERAL or carpenter foreman, 20 years' experience in general construction, such as bridges, schools or warehouses. Available immediately. PW-181, Engineering News-Record, Tenth Ave. at 36th Street, New York.

HIGHWAY engineer, 12 years' experience in construction and location of roads and bridges. Seven years with present employers. Desire permanent connection; consider contracting. Available on short notice. West or Pacific coast preferred. PW-184, Engineering News-Record, Bell Telephone Bldg., St. Louis, Mo.

HIGHWAY engineer—Age 35. Married. Technical education; 10 years' highway experience; 3 years preparation of Federal Aid Plans. Chief of party, location and construction surveys; 5 years' construction experience, instrumentman, inspector and resident engineer on concrete, macadam and gravel surfacing projects. A-1 draftsman. Best of references. Desire change for more permanent location. PW-165, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

PRACTICAL structural engineer wants to teach technical graduate, licensed, several years' experience, age thirty, married. PW-256, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

TUTORING

DRAFTING, surveying, mathematics, aviation, civil engineer teaches arithmetic, algebra, geometry, trigonometry, calulus, drafting, airplane, architectural. Mechanical, structural topographical, prepares colleges, Cooper Union, civil service, aviation examinations. Modell 1440 Broadway, N. Y.

SALESMEN WANTED

Sales Engineer Wanted

With established offices to represent a manufacturer of internal combustion engines. Give full particulars and territory capable of handling. Buffalo Gasolene Motor Company, Buffalo, N. Y.

Engineering Salesman Wanted

Engineer able to estimate structural and reinforcing steel and steel specialties from plans, and who has had successful experience selling a general line of building supplies. Give full particulars in first letter. SW-225, Engineering News-Record, Tenth Ave. at 36th St., New York.

Sales Engineer

With bar company experience to cover Eastern Pennsylvania, estimating and selling reinforcing steel. Apply by letter, giving full information on experience, age and salary desired. SW-253, Engineering News-Record, Tenth Ave. at 36th Street, New York.

REPRESENTATIVES AVAILABLE

STRUCTURAL engineer, with thirty years experience in detailing, designing, estimating, and selling wants connection, as representative in the state of Michigan, with a reliable fabricator who commands business on merit. RA-239, Engineering News-Record, 520 No. Michigan Ave., Chicago, Ill.

BUSINESS OPPORTUNITIES

INVENTIONS commercialized. Patented or unpatented. Write, Adam Fisher Mfg. Co., 529 Enright St., St. Louis, Mo.

PARTNER WITH $25,000

Wanted to organize a corporation selling and installing patented device in homes, hotels, factories, etc. Have exclusive ten year renewable license for U. S. and Canada. Write care of

BO-224, Engineering News-Record
Tenth Ave. at 36th St., New York City

FOR SALE

One or Two Sand and Gravel Washing and Screening Plants

at a sacrifice. Plenty of business at good prices but must dispose of the property. It will pay to investigate. Texas has a big road building program under way as well as industrial developments.

Address P. O. Box 1604, Waco, Texas

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10—4-yd. 36-in. Gauge **Dump Cars.**
1—**Crane,** 40-ft. boom, Crawler Tr.
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1—¾-yd. **Shovel,** Crawler Tr.
70—Pcs. **Steel Piling,** 26-ft.
1—10-ton **Road Roller,** Gas.
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For Sale On Favorable Terms Or Rent. Rental to Apply on Purchase Price.

1—Factory Rebuilt Gas-Air Shovel.
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1—Erie 1-yd. Caterpillar Shovel, bargain.
1—1-yd. Steam Combination Outfit for pile-driver or bank—cheap.
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1—30-B Diesel Dragline.
1—30-B Crane, steam, caterpillar, excellent.
1—20-B Diesel Shovel.
1—Erie A ½-yd. Steam Caterpillar Shovel

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Telephone—Pennsylvania 6795

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Gasoline Crawler Cranes

with 45 or 50 ft. boom, also new air compressors.

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Long Island City, New York
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Shovels—Draglines
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Operators always available.

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For hoisting, digging or dredging. Fully equipped. 1⅝-Yard Clamshell and Orange Peel Bucket. 90-ft. Boom and Steel A-Frame. Can lift 15 tons.

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Double Deck and SINGLE Cots

Mattresses—Blankets—Tents

CANVAS COVERS
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New and Slightly Used Navy and Army Tarpaulin—Various Sizes—Write for Particulars.

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NEW—
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WE CARRY A LARGE SELECTION OF REBUILT INSTRUMENTS.
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CANVAS COVERS

Waterproofed 15 oz. canvas

Slightly used — Guaranteed first class condition or money refunded
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Sizes	Sizes
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5 Cents a sq. ft.

Furnished complete with rope in hem, patched corners, heavy brass eyelets.

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Rebuilt, guaranteed, GURLEY'S and other good makes from $50 up. *Act quickly.* Instruments **Rented** or **Exchanged.** *All makes repaired,* reasonable prices

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Established 35 years

Largest Stock of Used Surveying Instruments in this Country

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Rebuilt and Guaranteed by the Manufacturers of "Sterling" Surveying Instruments. Sold subject to field test. Cash or terms. Your money's worth or your money back.

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Field and office complete equipments instrument repairing on all makes.

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ALPHABETICAL INDEX TO ADVERTISEMENTS

EQUIPMENT ADVERTISEMENTS RECEIVED TOO LATE FOR LOCATION ON THE FOLLOWING PAGES

appear on the page or two preceding as do also advertisements of Equipment Wanted and For Rent.

GENERAL CONTRACTORS EQUIPMENT

Allegheny Equipment Co.....128
Barnett Canvas Goods Co....122
Bay City Dredge Co.....129
Bentz Bros. 129
Braden, Jas. S. 122
Brooks Co., R. E., 124-127-128-129-130-131
Brown & Sites Co.....133
Bruning Co., Inc., Chas.....122
Buff 122
Byers Machine Co.....130
California Equip. Co.....131
City Contr. Co. 131
Clapp, Riley & Hall Eq. Co...127
Consolidated Products Co....124
Crane & Bucket Renting Co..122
Crane Srevice Co.....122
Dawson Daylight Coal Co....129
Duncan Construction Co....128
Ehrbar, Edw 128
Ellis, A. Lee.....120
Elphinstone Inc., D. C.....127
Equip. Corp. of America....125
Excavating Equipment Dealers, Inc. 126-128
Fay & Son, Edward.....131
Flaugher, R. G.....132
Forsythe Bros.....129-131-132
Frank, M. K.....131
Gansler, Lee.....129
Globe Sales & Mfg. Co.....122
Grey Steel Products Co.....130
Griner, Oswald 122
Guion, H. P.....131
Haiss Mfg. Co., Inc., Geo....130
Harbour, J. L.....132
Hitner's Sons Co., Henry A...124
Hoisting Machinery Co.....130
Huber Inc., I. H.....128
Hughes, James 131
Hunter Mchy. Co.....129
Hyman-Michaels Co. 131
Jordan Construction Co., Inc.124
Keiser, E. H.....124
King, Philip T.....130
Kolesch & Co.....122
Kues Bros. 122
Layton, M. L.....132
Lindheimer, S. W.....133
Lewis, C. Harry 131
MacNeal, Donald B.....128-129
McElroy, James 132
Manhattan Electrical Bargain Co. 124
Marine Metal & Supply Co.... 1
Marsh, John 129
Mason & Hanger 127
Mayer, F. 127
Nashville Industrial Corp....131
National Metal Trading Co..121
Norstrom, G. 122-130
O'Neill Co., A. J.....126
Overlook Machinery Sales...130
Pigeon River Tunnel Co.....124
Pittsburg Boiler & Machine Co.131
Pulsometer Steam Pump Co..126
Read Corp., Howard W.....129
Reiner & Co., Inc., John....185
Rennolds Equipment Co.....126
Ryan, Inc., V. & M.....122
Scullen Inc., S. A.....128
Sherwood, E. C.....131
Smith Co., H. Y.....128
Southern Iron & Equip. Co...130
Starr Contracting Co., Fred...122
Theroux, F. R.....132
United Engrs. & Constructors.124
Walsh Co., Richard P.....130
Walsh, J. T.....128
Warren-Knight Co. 122
Weil Co., J. H.....122
Weiss, B. M. 123
Wemlinger, Inc. 133
White Plains Washed Sand & Gravel Co. 129
Williams Brown & Earle....122
Wissler Instrument Co.....122

PILING

Brown & Sites Co.....133
Contractors Mach. Co.....133
Equipment Corp. of Amer....133
Hyman-Michaels Co. 133
Lindheimer, Inc., S. W.....133
National Hoisting Engine Co.133
Wemlinger, Inc. 133
Zelnicker in St. Louis.....133

PIPE

Albert & Davidson Pipe Corp.132
Albert Pipe Supply Co.....132
Flower City Pipe & Iron Co., Inc. 132
Greenspons Sons I. & S. Co., Jos. 132
Greenpoint Iron & Pipe Co..132
Hudson Pipe & Supply Co....132
Marine Metal & Supply Co...132
Pfaff & Kendall 132

RAILS

Equip. Corp. of America....125
Frank, M. K.....131
Hyman-Michaels Co.....131
Levis & Co., Henry.....131
Merchants Steel & Supply Co.131
Morrison & Sherman, Inc...131
Morrison Railway Supply Corp. 131
Perry, Buxton Doane Co....131
Sherwood, E. C. 131
Southern Iron & Equip. Co...130

RENT OR BUY THIS EQUIPMENT

AIR COMPRESSORS

1—100 cu.ft. Chi. Pneu. Port. Gasoline.
1—309 cu.ft. Ingersoll-Rand Portable Gasoline.
1—599 cu.ft. I-R. with 104 HP. General Electric, 3 ph., 60 cy., 220 volt motor. Complete.

AIR TOOLS

Boyer 60-80 Hammers—Thor Close Quarter Drills No. 8 and No. 9. Chicago Pneumatic No. 1 and No. 2 Drills.

BOILER

1—125-hp. Loco. Type, mounted skids, 125 lb. steam pressure, A.S.M.E.

BUCKETS

1—½-yd. Erie Peerless Clamshell with teeth.
1—⅝-yd. Byers Clamshell.
1—1 cu.yd. Blaw-Knox Dreadnaught No. 616.
1—1 cu.yd. Link-Belt.

CARS

30—4 cu.yd. Koppel, 36-in. Gauge, Rebuilt.

CRANES—GANTRY

2—15-ton Link-Belt Gantry Cranes, full revolving with 90-ft. boom, mounted on 30-ft. towers, steam operated.

DERRICKS—COMPLETE

1—25-ton steel Erectors Guy Derrick, 110-ft. mast, 100-ft. boom, complete.
1—15-ton American Terry Stiffleg Derrick, 70-ft. steel b'ms, 12-ft. steel bullwheels, complete.
1—15-ton Wooden Stiffleg Derrick, 12-ft. bullwheel, 80-ft. boom.
1—10-ton Lambert Steel Guy Derrick, 113-ft. Mast, 100-ft. b'm, 18-ft. bullwh'l, bucket op.
1—10-ton Insley 95-ft. Mast, 85-ft. Boom, 12-ft. Bullwheel, bucket operating.
4—5-ton steel Erectors Guy Derricks, 85-ft. masts, 75-ft. booms, complete.
2—5-ton all steel 50-ft. or 60-ft. booms, 42 ft. 8-in. Masts, Stiff Legs, fittings.

GASOLINE SHOVELS AND CRANES

1—Model 700 P&H Cat. Crane, 50-ft. boom.
1—¾-yd. Shovel Front for Model 206 P.&H. Complete.
1—1 cu.yd. complete Shovel Front for Link-Belt Gas Crawler, 22-ft. boom, 18-ft. all manganese dipper.
1—10-ton McMyler Cat. Crane, 40-ft. boom, completely rebuilt; wonderful condition.
1—Model 104 Northwest Crane, 60-ft. boom.
2—Model 105 Northwest Cranes, 40 ft. booms. One located Jacksonville, Fla.
2—Byers Bearcats, completely rebuilt, 28-ft. booms.

HOISTING ENGINES

2—75 HP. National Triple Drum Independent Motor Driven swingers and bank lever controls, 3 phase, 60 cy., 440 volts.
1—60-hp. National 3-drum with Independent swinger 3 ph., 60 cy., 220 v.
1—60 HP. Mundy DD 4-cyl. Waukesha motor.
1—40 HP. Novo 4-cylinder DD Gas. Like new.
1—30 HP. Domestic DD 4-cyl. Hercules motor.
1—30 HP. Lidgerwood DD, 3 ph., 60 cy., 220 v.
2—8¼x10 Triple Drum Lidgerwood.
1—7x10 Lidgerwood. DC, DD, with swinger attached. Boiler mounted.

KEYSTONE GRADERS

2—No. 4 Cat. Gas. Keystone Graders equipped with skimmer and ditcher attachments, ¾-yd. and 9/10-yd. dippers.

GASOLINE LOCOMOTIVES

1—6 ton Whitcomb 24-in. gauge.
1—14-Ton Plymouth, 36-in. Gauge. New 1927.
1—8-Ton Plymouth 36-in. ga., new late 1925.

ROLLERS

1—10-ton Austin 3-wheel 4-cyl. Gas. Pneu. Scarifier, like new.
1—10-ton Kelly-Springfield 3-wheel. With Scarifier.

LOCOMOTIVE CRANE

1—25-ton Industrial 8-wheel standard gauge DD, 60-ft. boom, new 1922. Condition like new.

STEAM PILE HAMMERS

1—No. 1 McKiernan-Terry.
1—9-B-2 McKiernan Terry.
1—Set 62-ft. Steel Pile Driver Leads.

STEAM AND ELECTRIC SHOVELS

1—Marion 37 Cat. Shovel, 1¾-yd. dipper, used 11 mos., perfect condition.
1—Marion 37 Electric Cat. Shovel, 2-yd. dipper
1—¾-yd. Marion 21 Traction Mounted Steam Shovel, High Lift.

TRACTORS

1—2-ton Holt, 2—10-ton Holts.
2—Linn Tractors, 1 equipped with 100 hp. engine and 1 with 75 hp. engine. All have 5-yd. bodies. In wonderful condition.

TRUCK CRANE

1—8-ton Universal, 20-ft. boom, new 1926. Mounted on Mack Chassis.

GASOLINE TRENCHER

1—Model 24-Cat. Parsons Trenching Machine.

MISCELLANEOUS

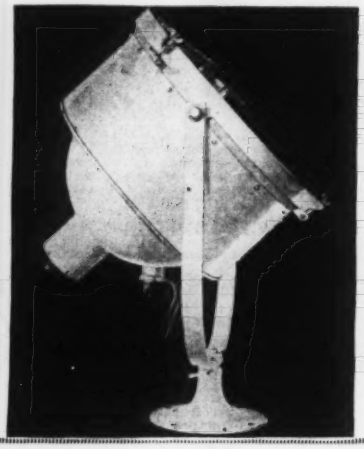
16—1¼-yd. Euclid Tractor Scraper Buggies.

B. M. WEISS

1324 Widener Bldg., Philadelphia, Pa.

Phone: Rittenhouse 2311

City Engineers and Contractors Attention!



300 brand new—Navy surplus—Pittsburgh Flood Lights for sale at a price you can't afford to miss. Regular price, $70.00.

Our price. . . .$27.50

Type F.L.C.-500—16-in. diameter, silver plated, copper back mirror reflector. Double adjusting—weatherproof. Takes 300 to 1,000 watt Mogul base lamp.

Also 75 Westinghouse Flood Lights with duraluminum reflectors all double adjusting, slightly used. Regular price, $90.00.

Our price. . . .$27.50

Suggested Outdoor Uses

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BEACHES
TENNIS COURTS
SWIMMING POOLS
GAS FILLING STATIONS
FOUNTAINS
STATUES
LIBRARIES
THEATRES
WAREHOUSES

Manhattan Electrical Bargain House

107 Fulton St., New York City

Also a few 24" Navy Searchlights at a low price

AIR COMPRESSORS
250-ft. Chicago Pneumatic NSS Steam.
220-ft. Ingersoll-Rand Portable Gasoline.
164-ft. Chicago Pneumatic GSS Steam.

BELT CONVEYORS
1—Barber-Greene 16-in.x42-ft. Gasoline.
1—Spec. Engr. 18-in.x25-ft. Electric.

CLAMSHELL BUCKETS
1—Williams 1½-yd. capacity, Scraper Type.
2—Hayward 1¼-yd. capacity, Class E.
1—¾-yd. capacity, Williams-Hercules Type.

CONCRETE MIXERS
2—Smith 1-yd. Steam.

DRAGLINES
1—Class 24 Bucyrus Electric, 100-ft. boom, 4-yd. buckets, A.C. motors.
1—Class 14 Bucyrus Steam, Crawler Traction, 70-ft. boom, 2-yd. bucket.

DUMP CARS
4—Western 6-yd. Capacity, Std. Gauge.

GIANTS—HYDRAULIC
1—American No. 1; 4—American No. 4.

DERRICK
1—Lambert Guy 10-ton, mast 85 ft., boom 70 ft.

HOISTS
1—O.&S. 50 hp., single drum A.C. Electric.
1—Lidgerwood 15 hp., single drum A.C. Elec.
11—Lambert 8½x10 D.C. D.D. with boilers.
1—A. H. & D. 7x10 D.C. D.D. with swinger.
1—Lambert 5½x8 D.C. D.D.
5—Mundy, single drum, belted.

LOCOMOTIVES
3—Mid-west 7-ton Std. Ga. Gas.
1—Mid-West 4-ton 24-in. ga. gas.

DROP-HAMMERS
4—Drop Hammers from 2,000 to 3,500 lbs.

ORANGE PEEL BUCKETS
2—Hayward, 1-yd. capacity, heavy duty.

LOCOMOTIVE CRANE
1—Industrial, 50-ton cap., std. ga. Wrecker.

PUMPS
2—Morris, 15-in. belted centrifugals.
4—Morris, 12-in., 3,400 G.P.M., 180-ft. head, 200-hp., 3-ph., 60-cy., 2,200-v. elec. motor.
1—Morris, 12-in. steam drive, 4,200 G.P.M., 30-ft. head.
2—Lawrence, 6-in., 1,100 G.P.M., 138-ft. head, Steam Turbine Drive.

ROCK DRILLS
1—Sullivan Quarry Bar, 5¼x6 in.
1—Sullivan FS 3 Deep Hole Drill.

SAND PUMP
1—Morris 8-in. belted.

SCREEN
1—Rotary Screen, 4 ft. dia. by 12 ft. long, with ½ in. Perforations.

STEAM ENGINES
1—11x16 in.; 1—14x16 in.; 1—14x18 in.

SWINGERS
1—Lambert 5½x8, geared.
1—Dake No. 3½ S Single Drum.
1—Mead-Morrison, 3x7, geared.

WELL DRILL
1—Sanderson Cyclone No. 14 ga. op. with fittings.

Equipment located in the East and Central West.

UNITED ENGINEERS & CONSTRUCTORS, Inc.

Surplus Equipment Department

112 North Broad St., Philadelphia, Penn.

27E REX PAVER

Full caterpillar type. Gasoline power. Boom and bucket. Recent model. Bargain.

R. E. Brooks Co., 50 Church St., N. Y. C.
Cortlandt 8240

PAVING MIXERS

Caterpillar—All Sizes
Koehring, Multifoote, Rex 27-E and 21-E.

CONCRETE MIXERS

All sizes—1 bag up to 2 yds. Priced low.

BLAW KNOX BINS

Richard P. Walsh Co.
30 Church St., New York City
Cortlandt 0723

Liquidation Bargains

6,000 ft. of **Belt, Scraper, Apron, Screw** and **Bucket Conveyors.**
Send for detailed list.

1—**Williams Swing Hammer Mill,** 22-in. wide, 9 Rows of Hammers.

1—**Link Belt** 2-roll **Coal Crusher.**

5—5x15-ft. **Rotary Screens.**

2—**Fate Plymouth** Model AL, 3-ton **Gasoline Locomotives,** 36-in. gauge.

Part of the liquidation of the machinery of the New Departure Reduction Co., Green Ridge, Staten Island, N. Y.

Send for Complete List.

Consolidated Products Co., Inc.
15-16 Park Row, New York City
Barclay 0600

STEEL LINE PIPE

25,000 lin. ft. 6⅝ in. O. D. plain end steel line pipe weighing approximately 11.65 lb. per ft., complete with Dresser couplings. All in first class condition.

DUMP MUCK CARS

60 Koppel Industrial Car & Equip. Co., all steel one side Dump Muck Cars: 60 cu. ft. capacity, for 30 in. ga. track; automatic lift door type and positive locking feature. Excellent condition.

PIGEON RIVER TUNNEL CO., Waterville, North Carolina

FOR SALE

1—Northwest, Model No. 2, Gasoline Shovel.
1—Fordson Tractor, with two drums, Ersted Hoist.
1—Lidgerwood Double Drum Super-Utility Gasoline Hoist, with third drum and swinging gear.
1—30 foot Chicago Automatic Belt Conveyor, with screening attachment.
1—5 Ton Dennis Derrick, 30 and 40 foot booms, complete with blocks.
1—1 Ton Sasgen Derrick, complete.
1—Barnes 6-in. x 4-in. Centrifugal Pump, complete.
1—Barnes Single Diaphragm Pump, complete.
1—Knickerbocker Portable Saw Rig.
1—No. 90 Buhl Compressor.
1—K-G Burning Outfit.
1—I-R Concrete Finishing Machine.
1—McKiernan-Terry Pile Sheathing Hammer.
4—I-R Jackhammers, BCR-430.
1—No. 2 Handy-Andy Pulling Machine.
1—I-R Hand Shanking Device.
1—Eclipse Paint Spray, complete.
3—Steel Scale Boxes.
2—Stuebner Self Righting Buckets.
2—Sets Insley Tower Sheaves.
1—10 x 10 Wire Rope Blasting Mat.

Miscellaneous air tools for rock excavation and steel erection; concrete equipment, etc.

Send us list of your requirements. All equipment priced for quick sale.

THE JORDAN CONSTRUCTION COMPANY, Inc.
24 James Street **ALBANY, N. Y.**

1903 — STARTING OUR — 1929 SECOND QUARTER CENTURY

"WE BUY—REBUILD—SELL OR RENT"

BINS AND BATCHERS

2—Blaw-Knox Batcher Plants with 250-ton steel bins, each with No. 56 sand inundator and No. 500 volume stone batcher and cement Weighing device.
4—Same as above with steel bottom for wood bins.
1—Blaw-Knox 65-ton Bin with stone and sand batchers for 28-S Mixer.
2—Johnson 46-yd. Bins with stone and sand batchers for 21-S and 14-S Mixer.
3—Blaw-Knox Inundators; one No. 28; two No. 14.

BOILERS

56—Boilers from 30 to 150 hp., Marine, Locomotive and Vertical.

BUCKETS

57—Clamshell, Orange Peel and Dragline Buckets.
18—New Williams Clamshell Buckets with teeth.
3—Hercules 1-yd.
3—Hercules ¾-yd.
6—Favorite 1-yd.
6—Favorite ¾-yd.

CARS

30—Koppel 5 yd., 36 in. gauge, heavy duty, 2 way dump with steel underframes.
15—Western, 5 yd., 36 in. gauge, 2 way dump.
A number of flat cars for standard gauge and 24 in. gauge. Several Easton 75 cu.ft. capacity standard gauge all steel one-way side dump cars.
30—24-in. gauge cars, 12 flat cars, 36 V-shape dump cars, 18 cu.ft. 27 cu.ft. and 40 cu.ft. bodies.

COMPRESSORS

2—Steam Driven Compressors, 1—Sullivan, 1500 ft., 1—Sullivan, 950 ft.
1—Ingersoll-Rand, size 14x9x12, Imperial Type 10, with intercooler, rated 374 ft. at 100 lbs. with pulley for belt drive.
1—Ingersoll-Rand Duplex, single stage, size 16x14, rated 1,198 cu. ft. at 30 lbs. pressure.
1—Sullivan, Class WG-3, size 10x12, rated 150 cu. ft. at 80 lbs. pressure.
15—Portable gasoline driven rated 92, 118, 210, 310 cu. ft. Ingersoll-Rand, Sullivan, Chicago, Pneumatic and Domestic.

CONCRETE MIXERS

1—Smith, size 56-S, tilting mixer with batch hopper and with or without 40 HP. A.C. motor.
96—Concrete Mixers, sizes 56-S, cap. 2 yd.; 28-S, cap. 1 yd.; 21-S, cap. ¾ yd.; 14-S, cap. ½ yd. With steam or electric power with side loaders or batch hoppers. Following makes: Marsh-Capron, Koehring, Milwaukee, Ransome, Smith, Smith-Chicago, Rex, Lakewood, Foote, Cube or Oshkosh.
46—7-S cap. 1 bag with low charging platforms, with gasoline engines.
2—32-E Koehring mixers with boom, bucket and 4-cyl. gasoline engine, mounted on 30-ton capacity ½ crawler trailer.

CONCRETE PLANTS

3—Insley steel towers 110 ft. high, with No. 372 (72 cu.ft.) bucket sliding frame, with 80 cu.ft. hopper, 30 ft. boom, 30 ft. boom chute, 30 ft. counterweight chute.
6—Ransome Concrete Tower Outfits, each consisting of 2-yd. tower bucket, 80 cu.ft. hoppers, straight and sloping back with sliding frames, booms, boom chutes and counterweight chutes.
Large quantity of straight line chutes. Lengths from 48 ft. to 10 ft., trussed and plain; also large lot of flexible drop chutes.

CONVEYORS AND ELEVATORS

1—Belt conveyors, 16-in.x30-ft. Portable with Gasoline Engine.
1—Link-Belt Bucket Elevator. 1—76 ft. center.
2—Weller, 50-ft., bucket elevator, capacity 50 yds. per hr.
1—Barber Green Portable loader on crawlers with Buda Gasoline Engine.
1—Link Belt Portable loader on crawlers, with Buda Gasoline Engine.

CRANES

1—Link-Belt gasoline, Model K-1, 10 ton, on full crawlers, with 50-ft. boom. Shop No. K-1024.
1—Northwest Model 104 Combination Shovel and Crane with 40 ft. boom and 1 yd. shovel dipper on crawlers. New 1926.
1—Northwest, Model 104, with 40-ft. boom, mounted on full crawlers.
1—Austin No. 5, gasoline, with 36-ft. boom, on full crawlers.
1—Byers Bear Cat on crawlers with 30 ft. boom.
1—Byers Model 10 Steam on half crawlers with 30 ft. boom.
1—Byers Auto crane on traction wheels with 30 ft. boom.
2—Type "B" Erie Crane or Dragline with 40-ft. boom and ⅜-yd. bucket also with steam shovel boom and ⅜-yd. dipper. Shop Nos. 3900 and 3047.
1—Industrial-Brown Hoist Type C.C. Gasoline on Crawlers, Combination Crane & Shovel ½ yd. Dipper, 36 ft. Boom.

DRILLS

208—Air Drills and Jackhammers including Ingersoll-Rand; Chicago Pneumatic Tool and Independent Pneumatic Tool—Jackhammers, Air Spades, Wood Borers and Riveting Hammers.

DERRICKS (Steel)

1—American 20-ton, 100-ft. boom, 50-ft. mast, with legs and sills, 20-ft. bullwheel.

DERRICKS (Wood)

50—American Wooden stiff leg derricks, some with 16-in. fittings and with 80-ft. booms and 16-ft. bull wheels, some with 14-in. fittings, with 50 to 70 ft. booms, and 12-ft. bull wheels, arranged for hook work or clam shell.

HOISTS (Electric)

1—National, 75 HP., 3-drum, with 75 HP. A.C. motor and separate 10 HP. electric swinger, with 10 HP. A.C. motor.
5—Two Drum National Electric Hoists with 100 hp., 80 hp., 60 hp. and 50 hp. A.C. motors.
6—Single Drum Electric Hoists, 3 Lambert with 100 hp., 1—Lidgerwood, 75 hp., 2—American 60 hp., all A.C. motors.
5—American double drum with attached swingers and with 37, 40 and 50 HP. A.C. or D.C. motors.

HOISTS (Steam)

1—Thomas 12x12-in. Steam Double Drum Special Drag Scraper Hoist.
85—Steam Hoists, ranging from size 10x12 to 5x8. Three drum, double drum and single drum, with or without boilers.

LOCOMOTIVE CRANES

1—Ohio 30-ton, 50-ft. boom, 8-wheel MCB. Shop No. 3367.
1—Browning No. 8, 20-ton, 50-ft. boom, 8-wheel, M.C.B. Shop No. 2143.
1—Ohio, 25 ton, with 50-ft. boom, 10-ft. extension, 8-wheel MCB. Shop No. 1786.
1—Browning No. 2, 15 ton, 50 ft. boom, 4-wheel standard gauge. Shop No. 643.

LOCOMOTIVES (Steam)

7—Standard gauge, saddle tank, steam Locomotives, all type 0-4-0.
2—Davenport, 25-ton, cylinders 12x16, shop Nos. 2070 and 2076.
1—Porter 24-ton, cylinders 12x16, shop No. 5093.
4—Vulcan, 21-ton, cylinders 11x16, shop Nos. 1417, 2039, 2580 and 3676.

LOCOMOTIVES (Gasoline)

6—Standard gauge Gasoline Locomotives; 2 Vulcan, 8-ton, Shop Nos. 3645-6; 4 Brookville Fordson 2-ton.
7—24-in. Gauge, 1—Whitcomb 7-ton, 1—Burton 6-Ton, 1—Whitcomb 6-Ton, 1—Plymouth 4-ton, 3—Whitcomb Fordson 3-Ton.

PUMPS (Centrifugal)

14—Centrifugal Pumps, all direct connected to 110 or 220 volt, 60 cycle, 3 phase, A.C. motors, one 12-in. Morris with 50 H.P. motor; one Allis-Chalmers 10-in. with 50 H.P. motor; one Fairbanks-Morse 8-in. with 25 H.P. motor; one Allis-Chalmers 6-in. with 25 H.P. motor; three Allis-Chalmers 6-in. with 20 H.P. motors, one Fairbanks-Morse 6-in. with 10 H.P. motor; one Kingsford 5-in., three stage, with 100 H.P. motor; one Gould 5-in. with 20 H.P. motor; one Allis-Chalmers 4-in. with 50 H.P. motor; one Worthington 4-in. with 75 H.P. motor; two Worthington 3-in. with 40 H.P. motors.
18—Centrifugal Pumps all direct connected to Gasoline Engines. 1—10-in. Barnes, 1—10-in. Gould, 2—8-in. Barnes, 1—6-in. Erie, 1—6-in. Union, 1—5-in. Gould, 1—4-in. Gould, 7—Swaby and 3—Gould 3-in.
9—Centrifugal Pumps all direct connected to Steam Engines. 1—10-in. Swaby, 1—8-in. Fairbanks-Morse, 1—8-in. Gould, 1—8-in. Morris (Sand) 3—6-in. Morris, (1 Sand).
50—Miscellaneous Pumps, consisting of pulsometer, steam force, diaphragm, gasoline force.

SHOVELS (Steam)

1—Type 37 Marion, full revolving steam shovel, on crawlers, 1¾-yd. dipper. Shop No. 5308.
1—Marion Standard Gauge R.R. Shovel, Model 60, Shop No. 2225, with 2½ cu.yd. Dipper.
2—Erie, type B, shovels, with ⅝-yd. dippers and equipped with 40-ft. crane boom, ⅝-yd. clamshell bucket. Shop No. 3900 and No. 3047.
1—Marion, model 21, steam Shovel, on crawlers, ⅝-yd. dipper, shop No. 4196.

STEEL PILING

Large tonnage available at various points.

SWINGERS

5—Clyde separate electric swingers with new 10 or 15 HP. A.C. or D.C. motors.

ALL EQUIPMENT LISTED ABOVE OWNED BY US AND IN OUR

3 PLANTS & CONOWINGO

Write for new stock list just off the press listing our complete stock of equipment owned by us.

EQUIPMENT CORPORATION OF AMERICA

Pittsburgh, Pa.	Chicago, Ill.	Philadelphia, Pa.	Conowingo, Md.
853 Empire Bldg.	1154 S. Washtenaw Ave.	635 Horn Bldg., 1601 Chestnut St.	Box 86
Phone: Grant 6100	Phone: Seeley 5100	Phone: Rittenhouse 6100	

Construction—WE BUY—SELL—TRADE—RENT—Equipment

AIR COMPRESSORS
4—Ing.-Rand 5x5 gas.
2—Chi. Pneu. 5x5 gas.
1—Schramm 30-ft. gas.
3—Gardner electric garage type.
1—Chi. Pneu. 6x6 Belt drive.
1—Chi. Pneu. 14x16 steam.
1—Ing.-Rand 599-ft. belt drive.
2—Ing.-Rand 12x10 belt drive.
1—Jackhammer.
20—Other various makes and sizes.

ASPHALT PLANTS
1—Andresen port maintenance & repair.
2—Merriman R. R. plants.
1—Iroquois R. R. plant.

BUCKETS
10—Clam Shells ½-¾-1-1¼ & 1½-yd.
7—Bottom dump 18 to 30 ft.
1—Blaw single line 1½-yd.
1—Brosius single line 1-yd.

CRANES, DRAGLINES AND SHOVELS
1—O.K. 3-Drum Hoist with 120-hp., 6 cylinder Motor, including 1½-yd. Drag Scraper, Blocks, Cable, etc.
1—Northwest 105 with 50-ft. boom.
1—Byers Bearcat.
1—Browning No. 8 50-ft. bm. Loco. type.
1—Keystone No. 4 comb. shovel & crane.
2—Page (draglines) 75-ft. booms 2½-yd. buckets.
1—Bucyrus 225B Stripper.
1—Marion 270 Stripper.
1—Speeder ½-yd. gas shovel.
60 other outfits from ⅛ to 6-yd. steam, gas and electric.
1—Marion 37 Electric Shovel.
1—Marion 21 Electric Shovel.
2—Type "B" Erie Steam Shovels.
1—Lorain "75" Combination Shovel and Dragline.

LOCOMOTIVES AND CARS
1—New 8-ton Milwaukee 24 in., gas.
2—Plymouth 6-ton, 24 in. gas.
3—Vulcan 12-ton 36-in. gas.
2—Plymouth 7-ton 36-in. gas, including 6—5-yd. cars and rail.
3—Davenport 36-in. Dinkies including cars, rail and shovel.
1—Davenport 40-ton Std. ga. Steam.
100 Cars various sizes and gauges.

HOISTS AND DERRICKS
2—Novo D/D 40 H.P. gas.
3—Novo D/D 18 H.P. gas.
3—Novo S/D 5 H.P. gas.
1—Fiory D/D 25 H.P. gas.
1—Clyde D/D 15 H.P. gas.
1—Clyde S/D 8 H.P. gas.
1—O. K. D/D 15 H.P. gas.
1—O. K. S/D 8 H.P. gas.
1—Lidg. 3/D 60 H.P. gas.
1—Lambert D/D 7x10 Steam.
1—American 3/D 10x12 steam.
1—American D/D 8¼x10 steam.
1—Stroudsburg 3/D 8¼x10 steam.
1—Stroudsburg 3/D 7x10 steam.
1—Thomas 2-speed D/D 150 H.P. without motor.
1—National 3/D 60 HP electric.
1—Thomas D/D 100 HP, D.C. motor.
1—Set American stiffleg irons for 16x16 in.
1—Set National stiffleg irons for 14x14 in.
1—Std. ga. derrick car.
15—Steel derricks, guy and stiffleg, 5 to 20 tons.
Lot Miscellaneous blocks, sheaves and irons.
1—Sauger stiff leg 3 ton, 35-ft. boom.
3—Steel Stiff Leg, cap. 75 tons, 100-ft. booms.
1—Steel Stiff Leg, cap. 25 tons, 100-ft. boom.
5—Thomas Double Drum Hoists with 65-hp. D.C. motors, including Independent Swingers.

PUMPS
12—Centrifugal 3-4-5-6-8 and 15-in. belt, steam and gas.
10—Duplex steam pumps.
8—Diaph. 3 & 4 in., sgle. and dble.
1—Goulds triplex, 3½x4.
1—Deming triplex, 5x8.
7—Barnes plunger, 3 & 4-in. suction.
5—Amer. submerged centrifugal, 8x6 and 10x8.

PAVING EQUIPMENT
1—Kelly 10-ton, 3-wheel Roller, gas power.
1—Lakewood 18 to 20 ft. steel subgrader.
6—Western 2-wheel Scrapers.
1—Fordson Tractor with crane attachment.
2—Koehring pavers, 27 and 21E.
1—Foote paver, 21E.
1—Austin 5-ton tandem gas roller.
1—Austin 10-ton 3-wheel gas roller.
1—Kelly 5-ton tandem steam roller.
1—Erie 5-ton tandem steam roller.
1—2-ton Caterpillar tractor.
1—Fordson tractor with shovel attach.
1—International tractor.
6—Blaw Knox 65-ton bin.
1—Lakewood 24-ft. finisher. Also complete industrial outfit.

MIXERS
2—New Wonder 7-S power loaders.
1—Koehring dandie, 7-S.
1—Oshkosh 7-S power loader.
1—Milwaukee 7-S on Ford truck.
1—New Austin 7-S.
1—Milwaukee 1-yd. A/C motor.
1—Rex 14-S power loader.

TRENCHERS AND BACK FILLERS
1—Buckeye wheeltype 6½-ft. deep.
2—Parsons type 30.
1—Barber-Greene model 44.
2—Austin Backfillers.

BOILERS
8—Vert. from 15 to 40 HP.
2—150 H.P. H.R.T.

CRUSHERS
1—No. 3 Jeffrey Lime Pulverizer.
1—No. 6 Austin Gyratory.
1—Chalmers 2-roll distintegrator.
3—Gates 2-3-4 and 5 gyratory.

SAWS
2—New No. 12 double arbor Beach gas.
2—Jones Superior all steel gas power.
2—Rip and cross cut gas power.

MISCELLANEOUS
1—Fordson Tractor with North Hydraulic Shovel.
1—Fordson Tractor with crane attachments.
4—No. 1 McKiernan sheeting hammers.
1—No. 5 Vulcan sheeting hammers.
1—No. 4 Vulcan Pile Hammers.
200—Column Clamps 12 to 24-in.
2—International 25 H.P. 2-cyl. gas engines.
2—International 60 H.P. 4-cyl. gas engines.
1—New Ideal 10-bar. tamper.
2—New Ideal strippers.

We also have for sale quite a large number of plants exceeding in value more than $1,000,000.

RENNOLDS EQUIPMENT CO., 812 Union Trust Bldg., CHICAGO, Illinois

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FOR SALE OR RENT
1—Osgood ⅞ yd., crawling tread, Steam Shovel, with or without crane attachments.

STEEL GUY DERRICK
1—10-ton, 70-ft. mast, 60-ft. boom, complete with bull wheel, cables, blocks, etc.

AIR COMPRESSOR
1—Ingersoll-Rand ER1, size 12x10, cap. 365 ft., short belt idler drive, air receiver, 60-hp. slip ring motor, 220 volt, A.C.

PUMP
1—Cameron centrifugal, 5-in. suction, 4-in. discharge, direct connected to 30-hp. A.C. motor; used ten days.

DRAG SCRAPER HOIST
1—Vulcan Electric, double drum, friction and reversible, Drag Scraper Hoist, direct connected to 25-hp. slip ring motor, 220 volt, A.C.

TRAVELING OVERHEAD CRANES
1—Morgan 100 ton, 55-ft. span.
1—Morgan 25 ton, 60-ft. span.
2—Morgan 10 ton, 36-ft. 8-in. span.
All the above Cranes used six months, 230 volt D.C.

MAGNET
1—E. C. & M. 54-in. dia. Magnet. Used two weeks.

BUCKETS
2—Page ⅜ and ½ yd., type C, dragline buckets.
1—Blaw-Knox 2 yd. Dreadnaught, used two weeks on gravel.

LOCOMOTIVE
1—45 ton, 0-4-0 saddle tank, standard gauge, I.C.C. requirements.

A. J. O'NEILL CO.
1524 Chestnut St.
Philadelphia, Pa.

Unusual Opportunities

Ingersoll-Rand Type XB-2, belt driven compressor, 19 in. x 12 in. x 16 in., capacity 835 ft., 100 pounds pressure.

212 hp. Edgemoor Water Tube Boiler, 1924, pressure 200 lbs., with stoker, practically new.

2—H.R.T. Boilers, 72 in. x 18 ft. 0 in., pressure 150 lbs., first class condition.

Steel Building, 30 ft. x 120 ft. with 15-ft. wings on both sides, with or without 10-ton box electric crane.

Also usual stock of machinery, tools and equipment.

Henry A. Hitner's Sons Company
Gaul and Huntingdon Sts., Phila., Pa.

Any Way You Look At It!

If you have water in your excavation you need a pump.

If you need a pump you need a Pulsometer.

If you get a Pulsometer you have the best pump.

For the man who wants to rent or try before he buys, NEW PULSOMETER STEAM PUMPS are available on Rental, Rental-Purchase or Deferred Payments—and occasionally we have USED pumps on hand.

Complete information is yours for the asking.

Pulsometer Steam Pump Co.
221 W. 41st St., New York City

Used—REBUILT—Reconditioned

Cranes—Shovels—Draglines—Trenchers
Steam—Gasoline—Electric

Unusual Liberal Terms

We can supply from stock the exact machine you require, at the price you are prepared to pay.

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Rebuilt Equipment

For Sale or Rent

LOCOMOTIVES

1—Std. Ga. 14x20 Vulcan 4-wheeled Saddle Tank, Shop No. 1705, weight 37½ tons.

2—Std. ga., 11x16 Davenport 4-wheeled saddle tanks, Shop Nos. 2123 and 2124, wt. 21½ tons, A.S.M.E.-Nat'l. Bd. Boilers.

1—Std. ga. 11x16 Davenport, wt. 21½ tons, A. S. M. E. Nat'l. Bd. Boiler, Shop No. 2155, new.

2—36 in. ga. 11x16 Davenports, wt. 21¼ tons, A. S. M. E. Nat'l. Bd. Boilers. Shop Nos. 2152, 3 new.

2—36-in. gauge 11x16 Porter, 4-wheel Saddle Tank, ASME boiler, weight 21½ tons, Shop Nos. 6901 and 6904.

1—36-in. ga. 30-ton Climax Locomotive, new 1925.

2—24-in. ga. 9-ton Davenport & Vulcan Saddle Tanks.

1—36-in. ga., 9x14, Porter, Shop No. 6958, weight 15 tons, A.S.M.E. boiler.

SIDE DUMP CARS

18—30-yd. Clark all-steel, drop door, automatic air dump cars.

8—20-yd. Magor all-steel Automatic Air Dump Cars.

10—20-yd. Western, all steel.

3—18-yd. Western, all steel.

28—12-yd. Western side dump, wood beds.

28—8-yd., 36-in. ga. Continental double truck, steel sill, wood beds.

4—8-yd. Stand. gauge, K.&J. Steel Beam, wood beds.

20—6-yd. K. & J. steel sills Truss-rod doors.

5—5-yd., 36-in. ga. Continental, steel sills, wood beds.

18—5-yd. Western, 36-in. gauge, heavy duty, wood beds.

14—4-yd. Western, 36-in. gauge, heavy duty, wood beds.

14—4-yd. K. & J. 36-in. ga. wood sills.

CRANES

1—20-ton McMyler, No. 388, 50-ft. boom, bucket operating.

1—15-ton Brownhoist 8-wheeled Crane, Shop No. 4520.

1—Dock Crane, bucket operating, 50-ft. boom, 7-ft. 10-in. gauge, 12-ft. wheelbase, capacity 15 tons at 18-ft. radius.

STEAM SHOVELS—Revolving

3—50-B Bucyrus Shop Nos. 4003, 4058 and 4302, steel caterpillars, std. boom equipment, A.S.M.E. boiler.

2—20-B Bucyrus, Shop Nos. 3748-4137, ¾ yd. capacity, steel caterpillars.

1—Type "B" Erie, Shop No. 2651, caterpillars, high lift boom, ¾ yd. capacity.

4—Erie Railroad Steam Ditcher cranes, Shop Nos. 1770-1772-2484 and 2485, 36-ft. booms, ¾-yd. clamshell buckets.

1—Type 0 Thew, Shop No. 1777, high-lift, traction wheels 2/3-yd. dipper.

SHOVEL PARTS

2—Pull-Shovel Attachments complete for 104 Northwest.

Complete Shovel Attachment with 1¾-yd. dipper for 50-B Bucyrus Steam Shovel.

All repair parts on hand for Model 60 Marion and standard 70-ton Bucyrus Steam Shovels.

2—Complete Shovel Attachments for K-2 Link-Belt, 1-yd. dipper.

Parts for Type B Erie.

1—1-yd. Erie Dipper.

Shovels, Cranes and Draglines—

2—Model 206 P. & H. Shovels, Cranes, Draglines, Shop Nos. 1764 and 2299. Steel caterpillars, 38-ft. crane boom, std. shovel boom, ¾-yd. dipper.

2—Model 105 Northwest, Shop Nos. 862 and 1063, Shovel Crane or Dragline, 40-ft. booms, ¾-yd. buckets.

2—Model 104 Northwest Shovels, Cranes, Draglines, Pull Shovels, Shop Nos. 986, 1811, 45-ft. booms, 1-yd. buckets — standard shovel equipment, standard pull shovel equipment.

1—Model 210 P. & H. Dragline, Shop No. 1077, 40 or 50-ft. boom, 1-yd. dragline bucket, armored caterpillars.

BUCKETS

¾ to 3½ cu. yd. cap. Clamshell and Dragline.

STEAM SHOVELS—Railroad

1—Model 80 Marion, Shop No. 1312, 4-yd.

1—88-C Bucyrus, Shop No. 3792, 3-yd. dipper, caterpillar mounting.

2—60-C Bucyrus, Shop Nos. 1286 and 1388, 2½-yd. dipper.

1—Model 60 Marion, Shop No. 2059, 2½-yd. dipper.

2—70-ton Bucyrus, Shop Nos. 920 and 1233, 2½-yd. dippers.

SPREADER CAR

1—Std. ga. Western heavy-duty, wood, No. 605.

DRAGLINE EXCAVATORS

1—50-B Bucyrus, Shop No. 4058, steel caterpillars, 50-ft. boom, fairlead, 1½ yd. Page bucket.

2—Model 220 Page, Shop Nos. 109 and 110, 72-ft. booms, 2½-yd. Page buckets, 100 hp. Charter Oil Engines, mounted on tandem trucks.

1—Class 14 Bucyrus, Shop No. 3493, 60-ft. boom, 2-yd. bucket, A.S.M.E. boiler, skid and roller mounting.

MISCELLANEOUS

1—Caterpillar "Sixty" Tractor, Shop No. P.A. 840, like new.

1—5-ton Holt Tractor with Bulldozer.

13—1½-yd. Western, Streich and Stroud Dump Wagons.

1—No. 55 Buhl Portable Air Compressor.

2—90-C Buhl Portable Air Compressors.

1—100 FD Buhl Fordson Unit.

1—160-Y Buhl Portable Air Compressors.

25—Milburn Carbide Lights.

1—7x8 Gould Triplex Pump, belt driven.

1—Austin New Era Elevating Grader.

1—5-ton Galion Gasoline Roller. Shop No. 795.

1—10-ton Buffalo Springfield Steam Rollers, Shop No. 10049.

1—12-ton Buffalo-Springfield Gasoline Roller, Shop No. 10815.

3—12-ton Galion Gasoline Rollers. Shop Nos. 331, 536 and 803.

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Handless 2-yd. Clamshell at 50-ft. Radius

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CRANE

1—¾-yd. P.&H., 40-ft. boom, gasoline engine, Skimmer Scoop. Good buy.

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Concrete Mixers

Ransome, 56S, Building Mixer, 2 yd., with 40-hp. G. E. Motor, batch hopper, measuring tank and batch meter. Only slightly used and a wonderful value. This for the contractor who likes new equipment.

Ransome Paver, 27E, on crawling tractors, 40-hp. Gas Engine. A real bargain.

Chain Belt 28-S Rex, 1 cu.yd., with motor house, batch hopper, water tank and power discharge; without motor. $500. Bargain.

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1—No. 3 Koehring 20 ton Gas Caterpillar Crane, 50-ft. boom with 1-yd. bucket. Just overhauled A-1 condition.

1—Insley Gas Caterpillar Shovel ½-yd. Fine condition, low price.

1—Rex 14-E Semi-Caterpillar, Gas Paver Boom and Bucket, only $500.00.

1—Rex 27-E Latest Type Paver with 6-cyl. Motor. New outfit used about 4 weeks.

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LOCATED CHICAGO, ILL.

1—Browning **Locomotive,** Type No. 8 wheel MCB., 25-ton capacity, equipped steam brake outriggers, double power driven drums, 50-ft. boom, A.S.M.E. boiler. Had about eight months' actual service. Buckets any size.

2—**Road Graders,** caterpillar, one man operated. Fordson power. Weir Attachments.

1—Holt 5-ton **Caterpillar Tractor** with Bulldozer Attachments. Shop No. 40928.

1—Austin 5-ton **Tandem Road Roller,** Shop No. 1653. Factory rebuilt. Like new. Never used. 50% first cost.

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EQUIPMENT PRACTICALLY NEW

1—**Bucyrus Erie Gas Shovel,** Type 1030 No. 10002, bought Sept., 1928. Only used one month. Mounted on caterpillar type traction and equipped with ¾-yd. dipper.

1—**Austin Special Elevating Grader** with revolving disc, 42-in. carrier and stub engine hitch. Machine No. 4786. Purchased Sept., 1928. Used only a month.

5—1½-yd. **Western Dump Wagons,** wide gauge with wood bolster and 3 up hitch including double trees and neck-yoke. Purchased September, 1928. Used only a month.

1—**Western Elevating Grader,** 36-in. carrier. Practically new.

MISCELLANEOUS

1—18-ft. **Lakewood Sub Grader.**
1—18-ft. **Lakewood Finishing Machine.**
1—**Rex Mixer,** 1 bag capacity.
6—1½-yd. used **Dump Wagons,** attractive price.

Duncan Construction Company
Yorkville, Illinois

2—20-ton **McMyler Loco. Cranes.**
1—35-ton **McMyler Loco. Crane.**
1—15-ton **Brown Hoist Loco. Crane.**
4—4-ton 36-in. gauge **Electric Locos.**
4—12-in. Belt Dr. Cent. **Pumps.**
2—**Pavers** 21 and 27E, Gas. Cr. Tr.

J. T. WALSH,
500 Brisbane Bldg., Buffalo, N. Y.

Shovel and Clamshell, Marion Steam ¾ Yd. on Caterpillars

In good working condition. Located near Pittsburgh, Pa.—For Sale or Rent—Rental may apply on purchase. Write or wire collect to

Excavating Equipment Dealers, Inc.
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FOR SALE

Erie "B2" Steam Shovel

With Trench Hoe and Extra Drum for same. May be seen working. In first class condition.

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HAISS LOADER

Good condition. Will demonstrate. Price reasonable.

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AIR COMPRESSORS
14—110-ft., 6-220-ft. Sullivan Portable Gas.

BOILERS
5—50-hp., 60-hp., 80-hp. and 100-hp. A.S.M.E.

BUCKETS, CLAMSHELL AND ORANGE PEEL
18—½-yd. to 3-yd. Williams, Blaw-Knox, Hayward and Owen.

BUCKETS, MISCELLANEOUS
25—½-yd. to 3-yd. Steuhner, Haynes and Douds—Concrete and Dirt Handling.

CABLEWAYS
2—15-ton, 1300-ft. span, Lidgerwoods, complete.
1—2-ton, 900-ft. span, Lidgerwood, complete.

CRANES
2—10-ton and 12-ton McMyler and Industrial Crawlers, GASOLINE.
8—7½-ton, 10-ton, 25-ton, 27½-ton, 35-ton Brownhoist, McMyler and Industrial STEAM.

HOISTS
6—15-hp., 30-hp., Lidgerwood and Mead-Morrison, sgl. and dbl. drum, GASOLINE.
12—20-hp., 40-hp., 50-hp., 60-hp., 75-hp. and 100-hp. Lidgerwood and Thomas, single and double drum ELECTRIC.
14—6¼x8, 7x10, 8¼x10, 9x10, 9½x12, 12x16 Lidgerwood, Lambert, National, American and Clyde single, double and three drum, STEAM.

LOCOMOTIVES
12—24-in., 36-in. and 42-in. ga. GAS. STEAM.

DERRICKS
2—2-ton Sasgens—30-ft. boom.
2—3-ton Sasgens—30-ft. boom and 42-ft. boom.
1—5-ton, Stiffleg, Bucket Optg., 60-ft. boom.
2—12-ton, 75-ft. boom and
2—20-ton, 100-ft. boom Terry Standard Steel Stiffleg, hook and bucket work.

MIXERS
31—7-S, 10-S, 14-S, 28-S Knickerbocker, Koehring, Ransome, gasoline and electric.

PILE HAMMERS
10—No. 3, No. 5, No. 6, No. 7 and No. 9B2 McKiernan-Terry.
1—No. 2 National.
4—No. 1 and No. 2 Vulcan.

PUMPS
6—2-in. High Pressure Road Pumps, GAS.
9—4-in. Diaphragm and Centrifugal, GAS.
1—6-in., 1—14-in. Centrifugal STEAM.
5—Nos. 5, 7 & 8 Pulsometers STEAM.

ROLLERS
3—5-ton Gallion, Jr., 3-wheel GAS.
5—10-ton with scarifier or without, Buffalo-Springfield—STEAM.
1—10-ton without Scarifier Buffalo-Springfield—GAS.

SHOVELS
2—Industrial Works Crawlers—⅞-yd.—GAS.
3—Erie Type B Crawlers—STEAM.

SWINGING ENGINES
8—5x6, 6x8, 7x8 Lidgerwood and American.

All of Above Either New or Rebuilt—Guaranteed to be in First Class Condition

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In good running condition.
Excellent buy for cash transaction.

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Portable Gyratory Crusher

BARGAIN

No. 3 Allis-Chalmers gyratory crusher, on wheel trucks, with side elevator; good working condition; handles 7-in. stone; immediate release; $950.

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150 hp. Ames Empire 125 lbs.
125 hp. Erie City Eco. 125 lbs. A.S.M.E.
40 hp. Ames Loco. Type, mounted on wheels.

MIXER
1—14-S Rex Mixer, Batch Hopper & Water Tank.

GRADERS
1-hp. Crawler Gasoline Grader.
1—Lkwd. Sb.Gdr., 16-18-ft., Jack ty., used 30 days.

BUCKETS
1—1-yd. Blaw-Knox No. 616 Dreadnaught Clam Shell Bucket.
1—½-yd. Owen's.
1—½-yd. Blaw-Knox.

COMPRESSOR
1—599 cu.ft. I-R. complete with mtr.

ELECTRIC HOIST
1—52 hp. Lambert D.D., with Auto Brake, 3-ph., 60-cy., 220-v.

GASOLINE CRANES
1—K-2 Comb. Link-Belt Crawler Crane 40-ft. b'm & 1¼-yd. shovel.
1—K-1 Link-Belt Crawler Crane. 50-ft. boom.

GAS HOIST
1—30 hp. National 3-drum Hoist gas.

GAS LOCOMOTIVE
1—14-ton 36-in. ga. Plymouth Gas Locomotive, purch's'd new 1927.

GAS SHOVEL
1—K-2 Link-Belt Crawler, with new 1¼-yd. Dipper.

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Barber-Greene Ditcher for gas main work almost new, used on sixty day job; about one-half price' big bargain.
Ransome Mast Hoist, 7 cu.ft. bucket, 60-ft. steel mast, 20-ft. sloping back bm. gin pole for erecting, used two months, like new, one-half price—$450.00.
One-half yard **Rood Dredge**, full crawler, gasoline, Climax engine, used ninety days; (St. Louis County, Duluth, own several), (price new $6500.00)—$1500.00.
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Aurora Western Crusher 8x22 in.—$350.00.
Hayward Orange Peel Buckets, good condition; 2-½ cu.ft. 4 leaves—$250.00; also 21 cu.ft. 3 leaves $550.00.
Champion No. 6 Crusher 12x26 in.—$650.00
Ingersoll-Rand Air Compressor 916 cu. ft., 40-lb. pressure, for belt drive, good condition—$700.00.
ALL F.O.B. OUR MILWAUKEE PLANT
Little Giant, ½ yd., 35-ft. boom **Gasoline Crane**, full crawler, overhauled, ready for work—$2500.00.
Osgood steam crane, full crawler, 30-ft. boom, in exceptionally fine condition, No. 831—$1750.00; with new 40-ft. boom—$2550.00.
Koehring 21-E full caterpillar paver, gasoline, boom and bucket, excellent condition—$2000.00
Clyde 80-HP. d.d. gasoline hoist, new 1928, used three months only, excellent bargain.
Two Clyde d.d. 50-HP. AC. 3-60-220 **electric hoists**, used sixty days only, exceptional buy.
Lidgerwood 30-HP. d.d. AC. 3-60-220 **electric hoist**, excellent condition—$750.00.
ALL F.O.B. OUR DETROIT PLANT
30 ft. **Ord Concrete Finishing Machine** with double moving truck belt attachment, like new, used on only 1½ mile road, cost new $3500.00—our price $2000.00. (New 18 or 20-ft. attachment can be had for this machine at $500.00.)
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Above Equipment Quoted Subject Prior Sale
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Hunter Machinery Company
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50—5-yd. Western Dump.

SPREADER CARS

1—All Steel Jordan—Rebuilt. Latest improvements. Good as new.

CATERPILLAR STEAM SHOVELS

3—50-B Bucyrus latest type.

FOR SALE OR RENT

2—78-C **Bucyrus**; good as new.
1—20-B **Bucyrus.**
2—40-ton Std. Ga. **Switching Locomotives.**

JOHN MARSCH, INC.

1307 Wrightwood Ave., Chicago

P-H or N-W CATERPILLAR

Located Chicago, Ill.

Model 600 Shovel, standard boom, dipper sticks, 1 cu. yd. dipper had 40 days' actual service since leaving factory. Serial No. 2683.

N-W Models 104 and 105, equipped any way to serve you accordance manufacturer's specifications. Latest caterpillar equipment. Serial Nos. 2400, 2038, 1372. Also have extra attachments for all Northwest units.

Have large stock of buckets, clamshell or dragline, almost any size.

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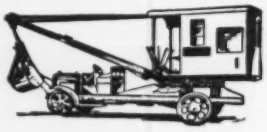

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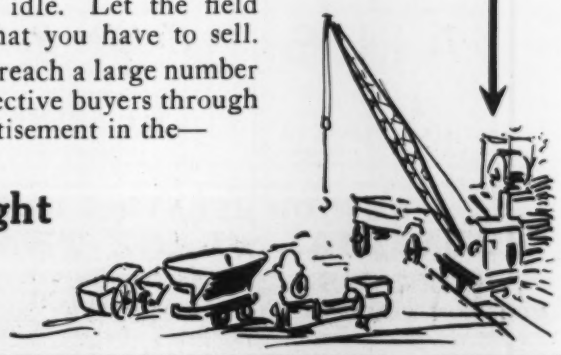

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Union Iron Works
Williams Co., G. H.

Buckets, Elevator
(See Elevators, Bucket)

Bucket, Excavating
Haiss Mfg. Co., Geo.
Harnischfeger Corp.
Moore Trench Machine Co
Williams Co., G. H.

Buckets, Orange-Peel
Browning Crane Co.
Hayward Co.
Orton Crane & Shovel Co
Owen Bucket Co.

Building Paper
Carey Co., Philip

Buildings, Steel
American Bridge Co.
Belmont Iron Wks.
Blaw-Knox Co.

Burners, Oil
Littleford Bros.

Cableways
Hayward Co.
Mundy Hoisting Engine Co.
Wickwire-Spencer Steel Co.

Cableways, Excavators
(See Excavators, Cableway)

Caissons
Bethlehem Steel Co.
Union Iron Works

Calculating Machines
Marchant Calculating Mach. Co.

Car Steps, Safety
Blaw-Knox Company

Car, Tankswood
Pacific Tank & Pipe

Cars, Air Dump, Industrial Square Box Hand Dump, etc.
Insley Manufacturing Co.
Koppel Industrial Car & Equipment Co.
Lakewood Engrg. Co.
Ramapo Ajax Corp.
Western Wheel Scraper Co.

Carts, Concrete
Insley Manufacturing Co
Lakewood Engrg. Co.
Ransome Concrete Mchry. Co.
Sterling Wheelbarrow Co.

Castings, Iron and Steel
American Cast Iron Pipe Co.
Bethlehem Steel Co.
Central Foundry Co.
Chain Belt Company
Fox & Co., John
Marion Malleable Iron Wks.
Marion Steam Shovel Co.
McWane Cast Iron Pipe Co.
Vulcan Iron Wks. of Pa.

Castings, Street and Sewer
Central Foundry Co.
Warren Fdy. & Pipe Co.

Cement
Louisville Cement Co.
Missouri Portland Cement Company

Cement Gun
Cement Gun Co., Inc.

Cement-Gun Construction
National Gunite Contracting Company

Cement-Making Machinery
Allis-Chalmers Mfg. Co.
Austin Mchry. Corporation
Koehring Co.
Vulcan Iron Wks. of Pa.

Centers, Steel Collapsible
Blaw-Knox Co.

Chain, Steel and Malleable Sprocket
Chain Belt Company
Haiss Mfg. Co., Geo.
Link-Belt Co.
Ryerson & Son, Joseph, T.

Chimneys, Concrete
Custodis Chimney Const. Co., Alphons
Heine Chimney Co.
Kellogg Co., M. W.
Rust Engineering Co.
Singer-Kennedy Corp.
Summerhays Sons, Wm.
Weber Chimney Co.

Chimneys, Radial Brick
American Chimney Corp.
Ballard, Sprague & Co.
Custodis Chimney Const Co., Alphons
Heine Chimney Co.
Kellogg Co., M. W.
Rust Engineering Co.
Singer-Kennedy Corp.
Summerhays Sons, Wm.

Chimneys, Steel
Blaw-Knox Co.
Connery & Company
Littleford Bros.
Pitts.-Des Moines Steel Co

Chutes, Concrete
Insley Manufacturing Co.
Lakewood Engrg. Co.
Ransome Concrete Mchry. Co.

Coal and Ore Conveying Machinery
Barber-Greene Co.
Bartlett & Snow Co., C. O.
Chain Belt Company
Haiss Mfg. Co., Geo.
Link-Belt Co.

Coal Storage Systems
Chain Belt Company
Haiss Mfg. Co., Geo.
Link-Belt Co.
Sauerman Bros.

Cofferdams, Steel
Bethlehem Steel Co.

Column Clamps
Universal Form Clamp Co
Wedgit Tie Co., Inc.

Column, Forms
Blaw-Knox Co.
Heltzel Steel Form & Iron Company

Column, Wrapping
National Steel Fabric Co.
Ryerson & Son, Inc.

Compositions, Anti-Corrosive
The Asphalt Products Co.

Compressors
Gardner-Denver Company
Independent Pneumatic Tool Co.

Compressors, Air, Heavy Duty
Allis-Chalmers Mfg. Co.
Buhl Company
Ingersoll-Rand Co.
McKiernan Terry Drill Co
Schramm, Inc.
Sullivan Machinery Co.

Compressors, Air Portable
Buhl Company
Cement Gun Co., Inc.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
Novo Engine Co.
Schramm, Inc.
Sullivan Machinery Co.

Concrete Admixtures
Johns-Manville Corp.

Concrete Curing
McEverlast, Inc.

Concrete Floor Hardener
American Fluresit Co.
Anti-Hydro Waterproofing Co.
Truscon Laboratories

Concrete Heaters
Littleford Bros.

Concrete Making Mchry.
Chain Belt Company
Koehring Mfg. Co.

Concrete Mixers
(See Mixers, Concrete)

Concrete Reinforcement
Bethlehem Steel Co.
Concrete Steel Company
Laclede Steel Co.
National Steel Fabric Co.
Rail Steel Bar Assn.
Ryerson & Son, Joseph T.
Universal Form Clamp Co.
Wickwire-Spencer Steel Co.

Concrete Workability, Agents
Johns-Manville Corp.

Condensers
Ingersoll-Rand Co.

Contractors
Cement-Gun Constr. Co.
Gunite Construction Co.
MacArthur Conc. Pile Corp.
National Gunite Contracting Company
Raymond Concrete Pile Co
Reed, Inc., G. O.
Spencer, White & Prentis, Inc.
Terry & Tench Co., Inc.

Conveying Systems
Moore Trench Machine Co.

Conveyors, Belt
Barber-Greene Co.
Chain Belt Company
Haiss Mfg. Co., Geo.
Link-Belt Co.

Conveyors, Belt & Chain
Haiss Mfg. Co., Geo.

Conveyors, Brick
Haiss Mfg. Co., Geo.

Conveyors, Bucket
Barber-Greene Co.
Bartlett & Snow Co., C. O.
Chain Belt Company
Haiss Mfg. Co., Geo.
Industrial Brownhoist Corp.

Conveyors, Portable
Haiss Mfg. Co., Geo.

Corner Bead, Metal
Concrete Steel Company

Cranes, Crawling Tractor
Austin Mchry. Corporation
Buckeye Traction Ditcher Co.
Byers Machine Company
General Excavator Co.
Harnischfeger Corporation
Koehring Mfg. Co.
Link-Belt Co.
Manitowac Eng. Works
Marion Steam Shovel Co.
Northwest Engine Co.
National Lead Company
Orton Crane & Shovel Co.
Universal Crane Co.

Cranes, Diesel
Link Belt Co.

Cranes, Electric
Byers Machine Company
Harnischfeger Corporation
Link Belt Co.
Marion Steam Shovel Co.
National Lead Company
Northwest Engine Co.
Universal Crane Co.

Cranes, Gasoline
Austin Mchry. Corporation
Buckeye Traction Ditcher Co.
Byers Machine Company
General Excavator Co.
Harnischfeger Corporation
Koehring Mfg. Co.
Link-Belt Co.
Manitowac Eng. Works
Marion Steam Shovel Co
Northwest Engine Co.
National Lead Company
Orton Crane & Shovel Co.

Cranes, Jib
Harnischfeger Corp.

Cranes, Locomotive
Austin Mchry. Corporation
Bay City Dredge Works
Browning Crane Co.
Bucyrus Erie Company
Harnischfeger Corporation
Industrial Brownhoist Corp.
Link-Belt Co.
Manitowoc Engineering Works
Marion Steam Shovel Co.
Northwest Engine Co.
Ohio Locomotive Crane Co
Orton Crane & Shovel Co.
Universal Crane Co.

Cranes, Motor Truck
Browning Crane Co.
Buckeye Traction Ditcher Co.
Harnischfeger Corp.
Orton Crane & Shovel Co.
Universal Crane Co.

Cranes, Overhead
Harnischfeger Corp.

Cranes, Steam
Byers Machine Company

Cranes, Traveling
Harnischfeger Corporation
Northwest Engine Co.

Cranes, Wrecking
Browning Crane Co.

Crawler Attachments
Haiss Mfg. Co., Geo.

Creosoted Blocks, Timber Poles, Cross-Arms, Lumber, Etc.
Jennison Wright Co.
Southern Wood Preserving Co.

Creosoting
American Creosote Wks.
Barrett Company
Jennison-Wright Co.
Savannah Creosoting Co.
Jennison-Wright Co.

Creosoting Oils
Barrett Co.

Cribbing Units Concrete
Amer. Cement Tile Mfg. Co.

Crushers and Pulverizers
Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
Universal Crusher Co.

Culverts, Corrugated
Canton Culvert & Silo Co.

Culverts, Metal
American Rolling Mill Co.
U. S. Cast Iron Pipe & Fdry. Co.

Culverts, Nestable and Riveted, Corrugated
Canton Culvert & Silo Co.

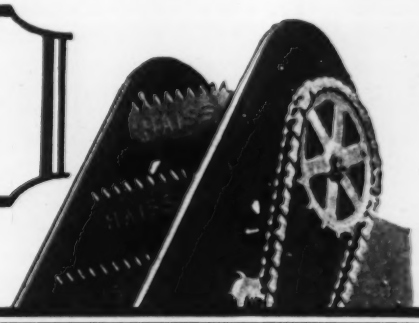
Curbs, Steel Protected
Concrete Steel Company

Dams
Ambursen Construction Co.

Dam Proofing
American Asphalt Grouting Co.
Dravo Equipment Co.

Dealers, Equipment
(See Searchlight Section)

HAISS



You can't mistake it!

LOOK at the Loaders you see at work. Look at the digging end. If it has the *simple, positive, revolving-propellers* like the one shown below, watch it dig. You can't mistake the Haiss machine—nor the efficiency of the Haiss patented self-feeding device.

Watch the action of the *continuous, slow-speed crowding motion.* Get closer and look at the gear box, and see how all the clutches and gears are housed in, dust and grit-free. They run in a bath of oil.

Notice the clean-up scraper, and how well it cleans up. Remember that the sprockets, creeper treads, elevator chain, paddle blades, etc., are of *manganese steel.*

Ask the operator what he thinks of the machine. In a Catalogue (*we'll be glad to send it—No.* 527) or on the job, you can't mistake real value when you see it.

George Haiss Manufacturing Co., Inc.

140th Street and Rider Ave. New York, N. Y.

Representatives in Principal Cities

Derricks and Derrick Fittings
American Terry Derrick Company
Dobbie Fdry. & Mach. Co
Haiss Mfg. Co., Geo.
Harnischfeger Corp.
Hayward Co.
Insley Manufacturing Co.

Diggers, Trench & Clay
Ingersoll-Rand Co.

Distributors, Pressure Oil
(See Road Oilers, Pressure)

Ditching Machinery
(See Excavators)

Diving Apparatus
Morse & Son, A. J.

Docks and Harbor Work
Raymond Concrete Pile Co.
Snare Corp., Fred'k.

Doors & Shutters, Steel Rolling
Kinnear Mfg. Co.

Drafting Machines
Universal Drafting Machine Co.

Drafting Room Furniture and Supplies
Hamilton Mfg. Co.
Weber Co., F.

Draglines
Bucyrus Erie Company
Byers Machine Company
General Excavator Co.
Harnischfeger Corporation
Industrial Brownhoist Corp.
Marion Steam Shovel Co.
Northwest Engine Co.
Universal Crane Co.

Drain Pipe, Iron
Asphalto-Concreto Corp.

Drawing Instruments
Pease Company, C. F.

Drawing Materials
American Lead Pencil Co.
Hamilton Mfg. Co.
Keuffel & Esser Co.

Drawing Tables
(See Tables and Boards Drawing)

Dredges
Bay City Dredge Works
Bucyrus Erie Company
Ellicott Machine Corp.
Hayward Co.
Marion Steam Shovel Co.
Norbom Engineering Co.
Osgood Co.

Dredges, Dipper
Austin Machinery Corp.
Bucyrus Erie Company
Ellicott Machine Corp.
Harnischfeger Corp.
Link-Belt Co.

Dredges, Hydraulic
Bucyrus Erie Company
Ellicott Machine Corp.
Marion Steam Shovel Co.
Morris Machine Works

Drills, Blast Hole
Gardner-Denver Company

Drills, Bore
Mott Core Drilling Co.

Drills, Core
Gardner-Denver Company
Ingersoll-Rand Co.
Keystone Driller Co.
McKiernan Terry Drill Co.
Morris Machine Works
Mott Core Drilling Co.
Sprague & Henwood, Inc.
Sullivan Machinery Co.

Drills, Electric
Independent Pneumatic Tool Co.

Drills, Rock
Ingersoll-Rand Co.
Sullivan Machinery Co.

Drums, Counterweight
Hayward Co.

Drums, Holding
Blaw-Knox Co.
Hayward Co.

Dryers
Bartlett & Snow Co., C. O.
Blaw-Knox Co.
Vulcan Iron Wks. of Pa.

Electric Plants
Kohler Company

Elevators, Bucket
Bartlett & Snow Co., C. O.
Chain Belt Company
Haiss Mfg. Co., Geo.
Hendrick Mfg. Co.
Lakewood Engrg. Co.
Link-Belt Co.
Ohio Locomotive Crane Co

Elevators, Contractors' Material
Chain Belt Company
Barber-Greene Co.
Dravo Equipment Co.
Insley Manufacturing Co.
Ransome Concrete Mchry. Co.
Union Carbide & Carbon Corp.

Elevators, Dragline
Northwest Eng'r'g Co.

Engineers
(See also Directory of Engineers)
Hunt Machine Company
MacArthur Conc. Pile Corp.
Raymond Concrete Pile Co
Spencer, White & Prentis, Inc.
Terry & Tench Co., Inc.

Engineers and Draftmen's Instruments and Supplies
Beckmann Company, L.
Chesterman & Co., Ltd.
Gurley, W. & L. E.
Hamilton Mfg. Co.
Higgins & Co., Chas. M.
Kern Company
Keuffel & Esser Co.
Lufkin Rule Co.
Marchant Calculating Mach. Co.
Weber Co., F.

Engineers, Roofing
Amer. Cement Tile Mfg. Co.

Engine, Accessories
Motor Improvements, Inc.

Engines, Gas, Gasoline, Oil
Allis Chalmers Mfg. Co.
Fairbanks Morse & Co.
Ingersoll-Rand Co.
Le Roi Company
Novo Engine Co.
Sterling Engine Co.

Engines, High Duty Water Works
Morris Machine Works
Sterling Engine Co.

Engines, Portable
Le Roi Company

Excavators
Haiss Mfg. Co., Geo.

Excavators, Bucket Type
Haiss Mfg. Co., Geo.

Excavators, Cableway
Sauerman Bros.

Excavators, Ditch & Trench
Austin Mchry. Corporation
Barber-Greene Co.
Bay City Dredge Works
Buckeye Tr. Ditcher Co.
Bucyrus Erie Company
Byers Machine Co.
Harnischfeger Corporation
Keystone Driller Co.
Link-Belt Co.
Marion Steam Shovel Co.
Moore Trench Mach. Co.
Northwest Engrg. Co.
National Lead Company
Parsons Co.
Star Drilling Machine Co.
Universal Power Shovel Co.

Excavators, Drag-Line
Austin Mchry. Corporation
Bay City Dredge Works
Blaw-Knox Company
Buckeye Traction Ditcher Co.
Bucyrus Erie Company
Byers Machine Co.
Harnischfeger Corporation
Hayward Co.
Koehring Co.
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engrg. Co.
National Lead Company
Orton Crane & Shovel Co.
Sauerman Bros.

Expanded Metal
Concrete Steel Company
Ryerson & Son, Inc.

Files, Steel
Carnegie Steel Co.

Filters, Water, Municipal & Industrial
Amer. Water Softener Co.
International Filter Co.
Leopold & Co., F. B.
Metropolitan Paving Brick Co.
Roberts Filter Mfg. Co.
Scaife & Sons Co., Wm. B.

Fireproofing Material and Construction
Concrete Steel Company
Kinnear Mfg. Co.
Metropolitan Paving Brick Co.
National Steel Fabric Co.

Floor Hardener, Concrete
(See Concrete Floor Hardener)

Floors, Asphalt Blocks
Standard Oil Co. of N. Y.

Floors, Asphalt Mastic
Standard Oil Co. of N. Y.

Floors, Composite Wood
Carter Bloxonend Flooring Company

Flooring, Fireproof
Blaw-Knox Company
Dravo-Doyle Company
Hendrick Mfg. Co.
National Steel Fabric Co.
Tri-Lok Company
Wood Iron & Steel Co., Alan.

Floors, Wood Block
Barrett Co.
Jennison-Wright Co.
Southern Wood Preserving Co.

Flumes, Iron and Steel
American Rolling Mill Co.
Blaw-Knox Co.

Forgings
Bethlehem Steel Co.

Form Clamps
Insley Manufacturing Co
Universal Form Clamp Co.
Wedgit Tie Co., Inc.

Form Tighteners
Marion Malleable Ir. Wks
Wedgit Tie Co., Inc.

Forms—Culvert, Road, Sewer, Tunnel, Etc.
Blaw-Knox Co.
Heltzel Steel Form & Iron Company
Lakewood Engrg. Co.

Forms, Curb and Gutter
Blaw-Knox Co.
Heltzel Steel Form & Iron Company
Lakewood Engrg. Co.

Formgraders
Ted Carr Company

Forms for Walls, Building Construction, Etc.
Blaw-Knox Co.
Heltzel Steel Form & Iron Company

Foundations
MacArthur Conc. Pile Corp.
Raymond Concrete Pile Co.
Simplex Conc. Pile Assn.
Spencer, White & Prentis, Inc.
Underpinning & Foundation Co.

Frogs and Switches, Railway
Bethlehem Steel Co.
Ramapo Ajax Corp.

Furnaces, Annealing & Tempering
American Bridge Co.

Garbage Disposal Appar.
Bartlett & Snow Co., C. O.

Gas Holders
Chicago Bridge & Ir. Wks.

Gates, Clam Shell
Haiss Mfg. Co., Geo.

Gates, Flood
Newport News Shipbuilding & Drydock Co.

Gates, Sluice and Valve
Coldwell Wilcox Co.
Columbian Iron Works
Hunt Machine Company

Gauges, Loss of Head
Simplex Valve & Meter Co

Gauges, Rate of Flow
Simplex Valve & Meter Co.

Gauges, Recording Pressure and Vacuum
Bristol Co.

Gauges, Water Level
Bristol Co.

Gears
Earle Gear & Mach. Co.
Haiss Mfg. Co., Geo.
Link Belt Co.
Vulcan Ir. Wks. of Pa.

Gears, Worm Reduction
Earle Gear & Mch. Co.
DeLaval Steam Turbine Co.

Generators, Electric
Allis-Chalmers Mfg. Co.

Governors, Waterwheel
Woodward Governor Co.

Graders, Elevating
Adams Company, J. D.

Graders, Road
Adams Company, J. D.
Bucyrus Erie Company
Good Roads Machinery Co.
Haiss Mfg. Co., Geo.
Rome Mfg. Co.

Graphite
Dixon Crucible Company, Joseph

Gratings, Flooring
Bates Steel Corp., Walter
Blaw-Knox Co.
Dravo-Doyle Company
Hendrick Mfg. Co.
Tri-Lok Company

Gratings, Safety
Bates Steel Corp., Walter
Blaw-Knox Co.
Dravo-Doyle Company
Tri-Lok Company

Gravel-Washing Plants
Link Belt Co.
Sauerman Bros.

Grills
Dravo-Doyle Company
Link-Belt Co.
Tri-Lok Company

Grinders, Air and Electric
Independent Pneumatic Tool Co.

Grouting
Amer. Asphalt Grouting Co.
Dravo Contracting Co.

Gunite Construction
Cement-Gun Co., Inc.
Cement-Gun Constr. Co.
Crom & Linberg
Gunite Construction Co.
Reed, Inc., G. O.
Rust Engr. Co.

Hammers, Pneumatic
(See Tools, Pneumatic)

Hammers, Steam, Pile
(See Pile Hammers, Steam)

Heaters, Concrete
Littleford Bros.

Heaters, Tar & Asphalt
Connery & Company
Littleford Bros.

Heaters, Tool
Littleford Bros

Hoists, Concrete, Tower
Insley Manufacturing Co.
National Hoisting Eng. Co
Ransome Concrete Mchry. Co.

Hoists, Contractors'—Electric
Allis-Chalmers Mfg. Co.
Bay City Dredge Works
Byers Machine Co.
Dobbie Fdry. & Mach. Co.
National Hoisting Eng. Co
Vulcan Iron Wks. of Pa.

Hoists, Contractors'—Gasoline
Harnischfeger Corporation
National Hoisting Eng. Co.
Novo Engine Co.
Vulcan Iron Wks. of Pa

Hoists, Contractors' Steam
Allis-Chalmers Mfg. Co.
Byers Machine Co.
Ingersoll-Rand Co.
Mundy Hoisting Engine Co.
National Hoisting Eng. Co
Vulcan Iron Wks. of Pa.

Hoists, Contractors Tower
Dravo Equipment Co.

Hoists, Electric
Harnischfeger Corp.
Novo Engine Company

Hoists, Gasoline
Mundy Hoisting Engine Co.

Hoists, Gates
Newport News Shipbuilding & Drydock Co.

Hoists, Hand
Harnischfeger Corp.
Hunt Machine Company

Hoists, Material Tower
Dravo Equipment Co.
Lakewood Engrg. Co.

Hoists, Pneumatic
Gardner-Denver Company
Ingersoll-Rand Co.
Sullivan Machinery Co.

Hoists, Power
Hunt Machine Company

Hoists, Skip
Bartlett & Snow Co., C. O.
Chain Belt Company
Link Belt Co.

Hoists, Steam, Air, Water
Chicago Pneumatic Tool

Hoppers, Concrete
Insley Mfg. Co.
Lakewood Engrg. Co.
Ransome Concrete Mchry. Co.

Hoppers, Steel
Blaw-Knox Co.
Erie Steel Constr. Co.
Heltzel Steel Form & Iron Company

Hose, Air
Goodyear Tire & Rubber Company

Hose, Steam, Air, Water
Gardner-Denver Company
Independent Pneumatic Tool Co.

Hydrants
Columbian Iron Works
Kennedy Valve Mfg. Co.
Ludlow Valve Mfg. Co.
Michigan Valve & Fdry Co.
Wood & Co., R. D.

Hydraulic Giants
Taylor Forge & Pipe Works

Hydrotite
Hydraulic Development Co.

Inks, Drawing
Higgins & Co., Chas. M.

Inserts, Concrete
Concrete Steel Company

Inspecting Laboratories
Hunt Machine Company, Rodney

Instruments, Precision
American Paulin System, Inc.

Instruments, Surveying
Berger & Sons, C. L.
Brandis & Son
Buff & Buff Mfg. Co.
Gurley, W. & L. E.
Kern Company
Keuffel & Esser Co.
Weber Co., F.

Interlocking Steel
Spencer, White & Prentis

Inundators For Constant Concrete
Blaw-Knox Co.

Jacks, Lifting
McKiernan Terry Drill Co
Templeton Kenly & Co.

Jacks Pipe Pushing
Templeton Kenly & Co.

Jacks, Screw
Templeton Kenly & Co.

Joint, Expansion Paving
Barrett Co.
Carey Co., Philip

Joints, Filler Paving
Barrett Co.
Standard Oil Co., of N. Y

Joints, Flexible Pipe
Central Foundry Co.

Kettles, Tar & Asphalt
Connery & Company
Littleford Bros.

Kilns, Rotary and Vertical
Vulcan Iron Wks. of Pa.

Ladder Steps, Steel
Blaw-Knox Company
Hendrick Mfg. Co.

Lath, Expanded Metal
American Rolling Mill Co.
Concrete Steel Company
National Steel Fabric Co.
Ryerson & Son, Inc.

Leadite,
Leadite Co. Inc.

Lead Pencils
American Lead Pencil Co.
Dixon Crucible Company, Joseph

Lettering Guides
Keuffel & Esser Co.

Lights, Contractors
Kohler Company

Loaders, Car & Wagon
Austin Mchry. Corporation
Barber-Greene Co.
Haiss Mfg. Co., Geo.
Link-Belt Co.

Loaders, Portable
Haiss Mfg. Co., Geo.

Locomotives, Compressed Air
Porter Co., H. K.

Locomotives, Electric
Cincinnati Car Corp.
Mancha Storage Battery Locomotive Co.
Porter Company, H. K.
Vulcan Iron Wks. of Pa.

Locomotives, Fireless Steam
Porter Company, H. K.
Vulcan Iron Wks. of Pa.

Locomotives, Gasoline
Porter Co., H. K.

Locomotives, Steam
Koppel Indust. Car & Equip. Co.
Porter Co., H. K.
Vulcan Iron Wks. of Pa.

Locomotives, Storage Battery
Mancha Storage Battery Locomotive Co.
Vulcan Iron Wks. of Pa.

Long Distance Systems
Bristol Co.

Lubricants
Dixon Crucible Company, Joseph

These two photographs taken at the plant of the Builders Sand Company, show how the Sauerman "Crescent" Scraper digs through the high bank, 600 feet wide, and moves the material up to the plant conveyor hopper at the rate of 50 tons per hour. One man runs the machine and takes care of any repairs that are necessary, these being few and far between.

Low Cost Production of Gravel

How the Sauerman Scraper method of digging and conveying sand and gravel serves to reduce production costs is exemplified at the plant of the Builders Sand Company near Akron, Ohio.

A 1½ cu.yd. Sauerman "Crescent" Scraper installation powered with a speedy, powerful Sauerman electric scraper hoist—operated by one man— produces all the material for this 500-ton per day plant.

No men in the pit—no human lives or machinery to be endangered if the bank should cave—just the simple scraper bucket working back and forth across the 600-ft. width of the deposit and bringing into the plant's belt conveyor an average of 50 tons of material per hour.

Is it any wonder that this plant and the hundreds of other modern sand and gravel plants equipped with Sauerman "Crescent" Scrapers are a source of satisfaction to their owners?

For full information on this cost-cutting method of producing gravel and handling all kinds of other excavating work, write for our new 96-page catalog.

Why a Sauerman Scraper will handle a given yardage of material with less power than any other type of scraper.

The secret of the great handling capacity of the Sauerman "Crescent" Scraper is to be found entirely in the unique design and construction of this remarkable scraper bucket. Due to its curved shape, it possesses the most powerful digging force of any type of scraper; at the same time it is easiest to pull, and so designed "that it rides" its load.

The "Crescent" is a natural digger and bites into the ground the instant it is pulled forward. It fills to capacity within a few feet of travel; then ceases to dig and "floats" on its load across the surface of the pit to the plant. In dumping, it makes a clean, quick discharge.

SAUERMAN BROS., Inc., 432 South Clinton St., CHICAGO

SAUERMAN

Lumber
National Lumber Mfrs. Ass'n.

Machinery, Paver
Chain-Belt Co.

Manhole Covers
Central Foundry Co.

Manometers
Simplex Valve & Meter Co

Metals, Perforated
Hendrick Mfg. Co.

Meters, Boiler Feed Water
Builders Iron Fdy.

Meters, Current
Gurley, W. & L. E.

Meters, Gas and Steam
Builders Iron Fdy.

Meters, Water and Oil
Builders Iron Fdy.
Neptune Meter Co.
Simplex Valve & Meter Co.

Mixers, Concrete
Austin Machinery Corp.
Cement Gun Co., Inc.
Chain Belt Company
Knickerbocker Co.
Koehring Mfg. Co.
Lakewood Engrg. Co.
Ransome Concrete Mchry. Co.
Transit Mixers, Inc.

Mixers, Grout
Austin Machinery Corp.
Ransome Concrete Mchry. Co.
Union Iron Works

Mixers, Hot
Austin Machinery Corp.

Mixers, Mortar
Knickerbocker Co.
Ransome Concrete Mchry. Co.

Mixers, Paving
Austin Mchry. Corporation
Chain Belt Company
Koehring Mfg. Co.
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Koehring Mfg. Co.
Link-Belt Co.
Marion Steam Shovel Co.
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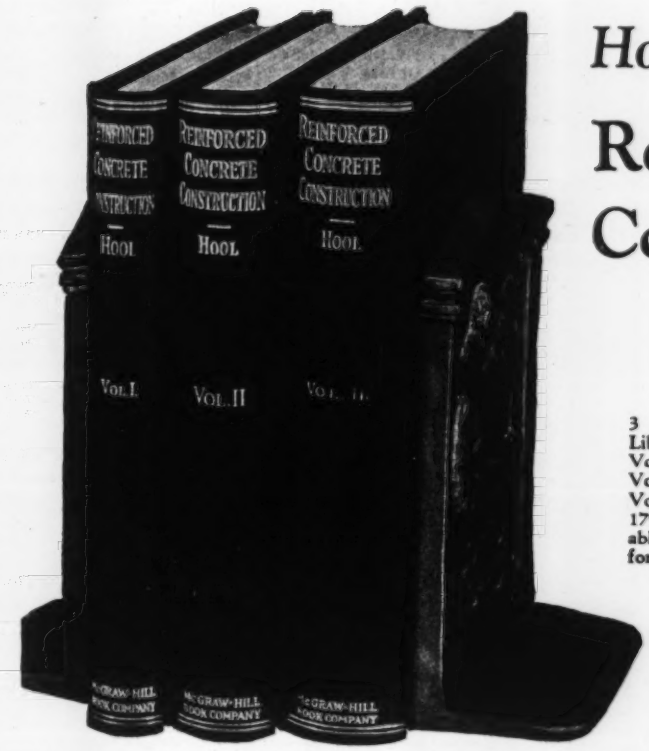

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	Page
Abendroth & Root Mfg. Co.	97
Adams Co., J. D.	80
Airmap Corp'n of Amer.	106
Allis-Chalmers Mfg. Co.	97
Ambursen Construction Co.	86
Amer. Asphalt Grouting Co.	86
American Bridge Co.	103
American Cable Company	91
American Cast Iron Pipe Co.	96
American Cement Tile Mfg. Co.	86
American Chimney Corp.	102
American Creosote Works, Inc.	82
American Fluresit Co.	88
American Hume Concrete Pipe Co.	95
American Lead Pencil Co.	104
American Paulin System, Inc.	107
American Rolling Mill Co.	16
American Terry Derrick Co.	90
American Tripoli Company	89
American Water Softener Co.	95
American Well Works	99
Anti-Hydro Waterproofing Co.	88
Asphalt Products Co.	82
Aurora Pump Co.	98
Austin Mchy. Corporation	50
Ballard-Sprague & Co.	102
Barber-Greene Co.	80
Barrett Co., The	4th Cover
Bartlett & Snow Co., C. O.	46
Bates Steel Corp., Walter	84
Bay City Shovels, Inc.	90
Beckman Co., L.	107
Belmont Iron Works	101
Berger & Sons, C. L.	107
Berlin Construction	101
Bethlehem Steel Co.	101
Blaw-Knox Co.	20-21-22-84-92-101
Brandis & Sons	106
Bristol Co.	93
Browning Crane Co.	90
Buckeye Tr. Ditcher Co.	92
Bucyrus-Erie Co.	11
Buff & Buff Mfg. Co.	106
Buffalo-Springfield Roller Co.	79
Buffalo Steam Pump Co.	97
Buhl Company	87
Builders Iron Fdry.	93
Byers Machine Co.	15
Cameron Steam Pump Works A. S. (Ingersoll-Rand Co.)	55
Canton Culvert & Silo Co.	96
Carey Co., Philip	54
Carr Co., Ted	80
Carter Bloxonend Flooring Co.	14
Cement Gun Co., Inc.	101
Cement-Gun Construction Co.	89
Cement Lined Pipe Co.	96
Central Foundry Co.	97
Chain Belt Company	49
Chesterman & Co., Ltd.	104
Chicago Bridge & Iron Works	100
Cincinnati Car Corp.	74
Clinton Bridge Works	103
Coldwell-Wilcox Co.	95
Cole Mfg. Co., R. D.	100
Columbian Iron Works	93
Concrete Steel Company	45
Connery & Company	80
Converse Bridge & Steel Co.	102
Cummer & Son Co., F. D.	79
Custodis Chimney Constr. Co.	102
DeLaval Steam Turbine Co.	98
Dixon Crucible Co., Joseph	85
Dobbie Fdry. & Mach. Co.	92
Dravo Contracting Co.	86
Dravo-Doyle Company	86
Dravo Equip. Company	86
Earle Gear & Mach. Co.	102
East Jersey Pipe Co.	96
Eastern Bridge & Structural Co.	103
Ellicott Machine Corp.	90
Ellis & Ford Mfg. Co.	96
Erie Machine Shops	79
Erie Pump & Engine Works	98
Erie Steel Constr. Co.	92
Fairchild Aerial Surveys	106
Farrand, H. A.	144
Fate-Root-Heath Co.	47
Fort Pitt Bridge Works	103
Fox & Co., John	97
Fruehauf Trailer Co.	109
Gardner-Denver Company	18
Garst Mfg. Co.	92
General Excavator Co.	31
Golden-Anderson Valve Specialty Co.	93
Good Roads Mchry. Co.	79
Goodyear Tire & Rubber Co.	145
Gunite Construction Co.	89
Gurley, W. & L. E.	107
Haiss Mfg. Co., Inc., Geo.	92-139
Hamilton Mfg. Co.	104
Harnischfeger Corporation	27
Harrisburg Pipe & Pipe Bending Co.	44
Hastings Pavement Co.	51
Hayward Company	92
Hazard Wire Rope Company	35
Heine Co., The	102
Heltzel Steel Form & Iron Co.	75
Hendrick Mfg. Co.	38
Higgins & Company, Chas. M.	78-105
Huber Mfg. Company	80
Hunt Machine Co., Rodney	94
Hydraulic Development Co.	96
Imperial Tracing Cloth Co.	108
Independent Bridge Co.	103
Independent Concrete Pipe Co.	95
Independent Pneumatic Tool Co.	79
Industrial Brownhoist Corp.	6-7
Ingalls Iron Works Co.	101
Ingersoll-Rand Co. (Cameron Steam Pump Works, A. S.)	55
Insley Manufacturing Co.	17
International Filter Co.	94
Jeffrey Mfg. Co.	5
Jennison-Wright Co.	Second Cover
Johns-Manville Corporation	73
Kellogg Co., M. W.	102
Kennedy Valve Mfg. Co.	94
Kern Co.	107
Keuffel & Esser Co.	107
Keystone Driller & Pump Co.	100
Kingsford Fdry. & Machine Works	98
Kinnear Mfg. Co.	84
Knickerbocker Co.	72
Koehring Co.	32
Kohler Company	87
Koppel Industrial Car & Equipment Co.	78
Laclede-Christy Clay Prod. Co.	95
Laclede Steel Co.	87
LaFrance Republic Sales Corp.	80
Lakewood Engrg. Co.	26
Lancaster Iron Works	100
Lawrence Pump & Engine Co.	97
Leadite Company	58
Lecourtenay Co.	100
Le Roi Company	23
Leschen & Sons, Rope Co., A.	90
Link Belt Co.	13
Linn Mfg. Corporation	80
Littleford Bros.	80
Lord & Burnham Co.	86-94
Louisville Cement Co.	60
Ludlow Valve Mfg. Co.	94
Lufkin Rule Co.	106
MacArthur Concrete Pile Corp.	40-41
McClintic-Marshall Co.	103
McEverlast, Inc.	81
McGraw-Hill Book Co.	89-104
McGraw-Hill Publishing Co.	Insert 48-49
McKiernan-Terry Drill Co.	12
McWane Cast Iron Pipe Co.	96
Mahon Co., R. C.	86
Mancha Storage Battery Locomotive Co.	78
Manistee Iron Works Co.	98
Manitowoc Eng. Works	28
Marchant Calculating Machine Co.	105
Marion Mallebale Iron Works	87
Marion Steam Shovel Co.	24
Metropolitan Paving Brick Co.	42-43
Michigan Pipe Co.	96
Michigan Valve & Fdry. Co.	93
Milwaukee Bridge Co.	103
Missouri Portland Cement Co.	48
Moore Trench Machine Co.	77
Monarch Tractors Company	39
Morris Machine Works	98
Morse & Son, Inc., A. J.	90
Motor Improvements, Inc.	90
Mott Core Drilling Co.	88
Mount Vernon Bridge Co.	103
Mundy Hoisting Engine Co.	100
Nash Engineering Co.	100
National Gunite Contr. Co.	89
National Hoisting Eng. Co.	92
National Lumber Mfrs. Ass'n.	83
National Steel Fabric Co.	29
Nat'l Water Main Cleaning Co.	94
Neptune Meter Co.	93
Newark Concrete Pipe Co.	95
Newport News Shipbuilding & Dry Dock Co.	88
Norbom Engineering Company	90
Northwest Eng. Co.	19
Novo Engine Co.	92
Ohio Locomotive Crane Co.	92
Ohio Power Shovel Co.	37
Ohrstrom & Company, G. L.	94
Orton Crane & Shovel Co.	34
Owen Bucket Co.	92
Pacific Flush Tank Co.	95
Pacific Tank & Pipe Co.	96
Page Engineering Co.	100
Parsons Co.	80
Patent Scaffolding Company	52
Patterson Co., W. W.	103
Pelton Water Wheel Company	100
Pennsylvania Drilling Co.	88
Petroleum Iron Works Co.	100
Phoenix Bridge Co.	103
Pittsburgh-Des Moines Steel Co.	100
Plymouth Locomotive Works	47
Pollock Co., Wm. B.	101
Porter Co., H. K.	78
Pressitite Engrg. Company	95
Pulsometer Steam Pump Co.	100
Rail Joint Company	78
Rail Steel Bar Ass'n.	33
Ramapo Ajax Corp.	78
Ransome Concrete Mchry. Co.	8
Raymond Concrete Pile Co.	3
Reading Iron Co.	36
Reed, Inc., G. O.	89
Republic Iron & Steel Co.	97
Riter-Conley Co.	101
Roberts Filter Mfg. Co.	94
Roebling's Sons Co., J. A.	91
Rust Engineering Co.	89-102
Ryerson & Son, Jos. T.	53
Sauerman Bros.	141
Savannah Creosoting Co., Inc.	82
Scaife & Sons Co., Wm. B.	95
Schramm, Inc.	87
Shoemaker Bridge Co.	103
Simplex Concrete Pile Ass'n.	89
Simplex Valve & Meter Co.	93
Simplex Wire Cable Co.	91
Singer-Kennedy Corp.	102
Snare Corp., Frederick	80
Southern Wood Preserving Co.	82
Spencer, White & Prentis, Inc.	91
Sprague & Henwood, Inc.	88
Standard Oil of New York	30
Standard Wood Pipe Co.	96
Star Drilling Mach. Co.	90
Steele & Condict, Inc.	102
Sterling Engine Co.	98
Sterling Wheelbarrow Co.	84
Sullivan Machinery Co.	4
Summerhays Sons, Wm.	102
Taylor Forge & Pipe Works	97
Templeton, Kenly & Co.	78
Terry & Tench Co.	102
Transit Mixers, Inc.	25
Tri-Lok Company	86
Truscon Laboratories	3rd Cover
Underpinning & Foundation Co.	10
Union Iron Works Co., Inc.	91
Universal Crane Co.	9
Universal Crusher Co.	79
Universal Drafting Machine Co.	106
Universal Form Clamp Co.	82
Universal Portland Cement Co.	56
Universal Power Shovel Co.	2
Virginia Bridge & Iron Co.	103
Vulcan Iron Works, Chicago	91
Vulcan Iron Works, Pa.	78
Weber Chimney Co.	102
Weber Company, F.	105
Wedgit Tie Co., Inc.	86
Western Wheeled Scraper Co.	78
Wickes Bros.	104
Wickwire Spencer Steel Co.	91
Williams Co., G. H.	92
Wisconsin Bridge & Iron Co.	102
Wood Co., R. D.	93
Wood Iron & Steel Co., Alan	87
Wood Shovel & Tool Co.	76
Woodward Governor Co.	98
Wyckoff & Son Co., A.	96
Wyckoff Pipe & Creosoting Co.	82

SEARCHLIGHT SECTION

Classified Advertising

BUSINESS OPPORTUNITIES. 121

COMMISSARY AGENTS
- Beacon Commissary Corp. 113
- Central Boarding Supply. 112

CONTRACT BONDS
- Marcucci Supply Co. 119
- Swart, Harmon V. Associates. 117

EDUCATIONAL
- Wilson Engineering Corp. 118

EMPLOYMENT 118-119-120-121

ENGINEERS 134-135-136-137

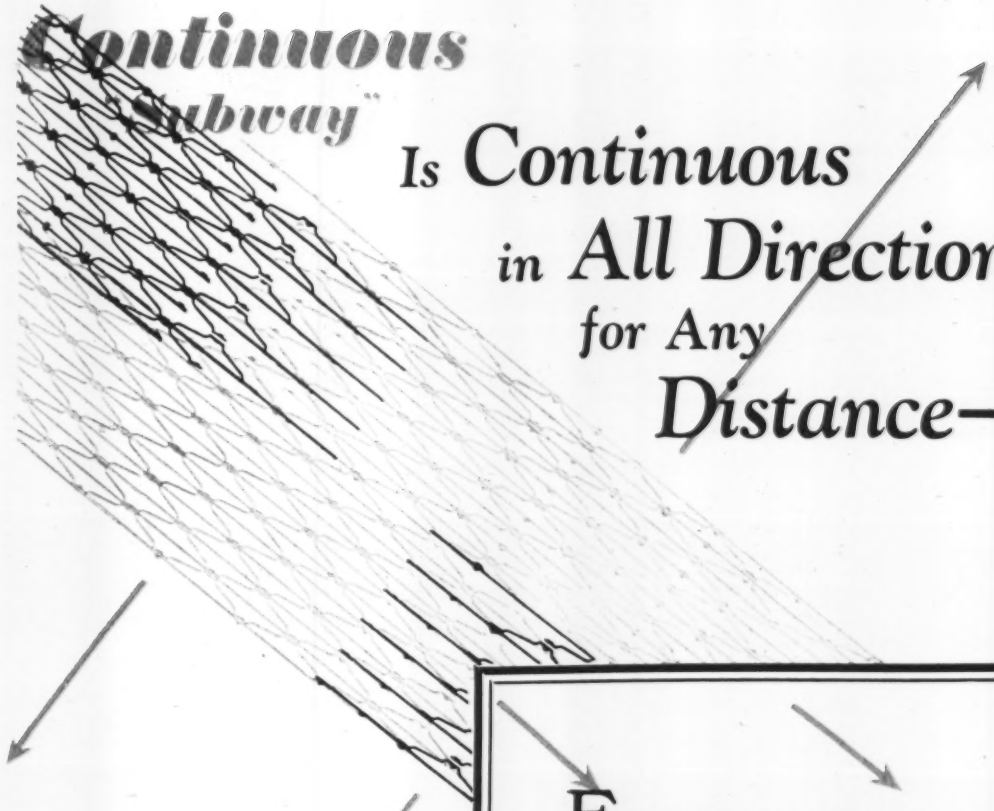
PATENTS 121

PROPOSALS 112-117

SURVEYING INSTRUMENTS, (USED) 122

USED AND SURPLUS EQUIPMENT 122-133

For Alphabetical Index to Used Equipment Advertisers see page 123



"Continuous Subway" Is Continuous in All Directions for Any Distance—

ENGINEERS and plant executives—planning and executing plant betterments—have for years been using ***Irving*** "Subway" open steel Flooring for its cleanliness, slip-proofness, ventilating and lighting advantages, and other outstanding superiorities. And they have accepted the "panel" construction even though it did involve possible trouble from loose butt joints.

But now even this potential trouble is totally eliminated in ***Irving "Continuous Subway"*** with its "*Streamline Splice*" which makes a floor unbroken and continuous in every direction, and of any area.

And this "Continuous" feature is as invaluable in the armoring of cement, mastic, or plastic floors, as in an open steel floor.

Get the facts—in Bulletin 2H-5.

IRVING

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It Will Be Worth While

to demand this "Continuous" feature, regardless of the type or style of grating you prefer.

17½ mile FEDERAL AID project

black base

Steadily, the Black Base highway is gaining in popularity. In this type of construction, both the foundation and wearing surface are of asphalt.

Possibly the most prominent Black Base job now under construction is Federal Aid Project 495-A in Shackelford County, Texas, which is approximately 17½ miles long. In this Project, a 3½ inch TEXACO Asphaltic Concrete foundation is being laid, over which is to go a two-inch coarse mix TEXACO Asphaltic Concrete wearing surface. Under the asphalt has been constructed a Caliche sub-base, varying in depth from six to eight inches.

An unusual and interesting feature of this Project is the fact that the TEXACO Asphalt has to be hauled five miles by tank truck from the railroad siding to the asphalt plant. The plant is located near the rock crusher on the Project.

The important advantages of Black Base or All-Asphalt roads and streets are constantly receiving recognition in articles written by leading highway authorities of the country.

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